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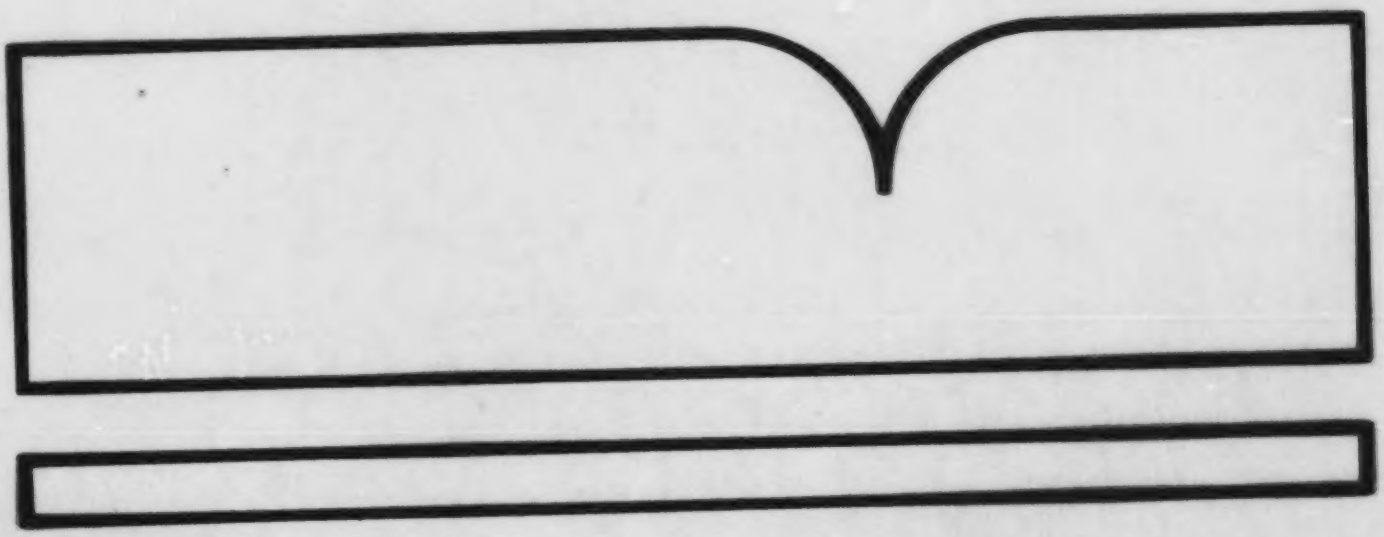

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Volume II. Appendices

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16. ABSTRACT

The Second Edition of the Industrial Soruce Complex Dispersion (ISC) Model User's Guide provides a detailed technical discussion of the revised ISC Model. The ISC Model was designed in response to the need for a comprehensive set of dispersion model computer programs that could be used to evaluate the air quality impact of emissions from large industrial source complexes. Air quality impact analyses for industrial source complexes often require consideration of factors such as fugitive emissions, aerodynamic building wake effects, time-dependent exponential decay of pollutants, gravitational settling, and dry deposition. The ISC Model consists of two computer programs that are designed to consider these and other factors so as to meet the dispersion modeling needs of air pollution control agencies and others responsible for performing dispersion modeling analyses. Major features in the revised model code include: (1) a regulatory default option which incorporates regulatory guidance contained in the Guideline on Air Quality Models as revised in 1986; (2) a calms processing procedure; (3) a new Urban Mode 3 which utilizes urban dispersion parameters published by Briggs based on observations of McElroy and Pooler in St. Louis, and (4) revised sets of wind speed profile exponents for rural and urban scenarios.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
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U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Radiation
Office of Air Quality Planning and Standards
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DISCLAIMER

This report has been reviewed by the Office of Air Quality Planning and Standards, EPA, and approved for publication. Mention of trade names or commercial products is not intended to constitute endorsement or recommendation for use.

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APPENDIX A

COMPLETE FORTRAN LISTING OF THE

INDUSTRIAL SOURCE COMPLEX

SHORT TERM MODEL (ISCST)

COMPUTER PROGRAM

```
C                  ISCST (VERSION 86170)                                ISC00010
C                  SOURCE: UNAMAP FILE ON EPA'S UNAVAC 1110, RTP. NC.   ISC00020
C     THIS VERSION OF ISCST WAS PREPARED IN 1986                        ISC00030
C     BY TRC ENVIRONMENTAL CONSULTANTS INC. FROM THE                    ISC00040
C     VERSION CONTAINED IN UNAMAP VERSION 5.                            ISC00050
C     THE FOLLOWING FEATURES HAVE BEEN ADDED:                           ISC00060
C        OPTION FOR BRIGGS URBAN DISPERSION COEFFICIENTS                ISC00070
C        ISW(20)=3.                                                     ISC00080
C        A PLUME RISE FORMULATION THAT IS                               ISC00090
C        CONSISTENT WITH THE MPTER MODEL.                               ISC00100
C        OPTION FOR BUOYANCY INDUCED DISPERSION, ISW(26).               ISC00110
C        THE MINIMUM SOURCE-RECEPTOR DISTANCE HAS                       ISC00120
C        BEEN REDUCED FROM 100M TO 1M.                                  ISC00130
C        OPTION FOR CALM WIND TREATMENT OF NWS                          ISC00140
C        METEOROLOGICAL DATA, ISW(27).                                  ISC00150
C        REVISIONS THROUGH H.E. CRAMER CO.'S                            ISC00160
C        UPDATE PACKAGES HAVE BEEN INCLUDED.                            ISC00170
C        POLLUTANT INDICATOR OPTION, ISW(29).                           ISC00180
C        A TERRAIN TRUNCATION ALOGORITHM HAS BEEN ADDED.                ISC00190
C        AN OPTION TO PRINT INPUT DATA AS SOON AS IT IS                 ISC00200
C        INPUT HAS BEEN ADDED,ISW(30).                                  ISC00210
C        A "REGULATORY DEFAULT OPTION" SWITCH, ISW(28).                 ISC00220
C        DEFAULT WIND PROFILE COEFFICIENTS FOR                          ISC00230
C        RURAL AND URBAN OPTIONS, ISW(21).                              ISC00240
C        DEFAULT VERTICAL POTENTIAL TEMPERATURE GRADIENTS ARE           ISC00250
C        ASSIGNED IF DEFAULT OPTION CHOSEN.                             ISC00260
C        RECEPTORS BELOW PLANT GRADE ARE TREATED IN                     ISC00270
C        THE SAME MANNER AS RECEPTORS ABOVE                             ISC00280
C        PLANT GRADE.                                                   ISC00290
C        CALCULATIONS FOR NEGATIVE DEPOSITION                           ISC00300
C        HAVE BEEN SET TO ZERO(SO307340-2).                             ISC00310
C      THESE FEATURES ARE DESCRIBED IN MORE DETAIL                      ISC00320
C      UNDER "CARD GROUP 2" BELOW.                                      ISC00330
C******        INDUSTRIAL SOURCE COMPLEX SHORT TERM MODEL          ******ISC00340
C         WRITTEN BY CRAIG S. CHENEY, H. E. CRAMER CO., INC.            ISC00350
C                                                                       ISC00360
C          THIS PROGRAM IS DESIGNED TO CALCULATE GROUND-LEVEL           ISC00370
C     CONCENTRATION OR DEPOSITION FROM STACK, VOLUME OR AREA SOURCES.   ISC00380
C     THE RECEPTORS AT WHICH THE CONCENTRATION OR DEPOSITION ARE        ISC00390
C     CALCULATED MAY BE DEFINED ON A X,Y RIGHT-HANDED CARTESIAN         ISC00400
C     COORDINATE SYSTEM GRID OR A POLAR COORDINATE SYSTEM GRID.  THE    ISC00410
C     POLAR COORDINATE SYSTEM DEFINES 360 DEGREES AS NORTH (POSITIVE    ISC00420
C     Y-AXIS), 90 DEGREES AS EAST (POSITIVE X-AXIS), 180 DEGREES AS     ISC00430
C     SOUTH AND 270 DEGREES AS WEST.  WIND DIRECTIONS ARE ALSO DEFINED  ISC00440
C     IN THIS MANNER.  DISCRETE OR ARBITRARILY PLACED RECEPTORS MAY BE  ISC00450
C     DEFINED USING EITHER COORDINATE SYSTEM.  FINALLY, SOURCE LOCATIONSISC00460
C     MUST BE REFERENCED WITH THE CARTESIAN COORDINATE SYSTEM.          ISC00470
C                                                                       ISC00480
C          AVERAGE CONCENTRATION OR TOTAL DEPOSITION MAY BE CALCULATED  ISC00490
C     IN 1-, 2-, 3-, 4-, 6-, 8-, 12-  AND/OR 24-HOUR TIME              ISC00500
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C     PERIODS.  AN 'N'-DAY AVERAGE CONCENTRATION (OR TOTAL DEPOSITION)  ISC00510
C     OR AN AVERAGE CONCENTRATION (OR TOTAL DEPOSITION) OVER THE TOTAL  ISC00520
C     NUMBER OF HOURS MAY ALSO BE COMPUTED.                             ISC00530
C     CONCENTRATIONS (DEPOSITIONS) MAY BE COMPUTED FOR ALL SOURCES OR   ISC00540
C     FOR ANY COMBINATION OF SOURCES THE USER DESIRES.                  ISC00550
C     OTHER OPTIONS INCLUDE INPUT OF TERRAIN HEIGHTS FOR RECEPTORS,     ISC00560
C     TABLES OF HIGHEST AND SECOND HIGHEST CONCENTRATIONS OR            ISC00570
C     DEPOSITIONS AT EACH RECEPTOR, TABLES OF THE FIFTY MAXIMUM VALUES  ISC00580
C     CALCULATED AND TAPE OUTPUT.  REFER TO SECTION 3 OF THE USER'S     ISC00590
C     MANUAL FOR A MORE DETAILED EXPLANATION OF THE ABOVE OPTIONS.      ISC00600
C                                                                       ISC00610
C         THIS PROGRAM IS WRITTEN IN FORTRAN 77 AND ASSUMES A WORD      ISC00620
C     LENGTH OF 32 BITS OR MORE SINCE 4 ALPHANUMERIC CHARACTERS ARE     ISC00630
C     EXPECTED TO BE STORED INTO ONE WORD.  THE BASIC PROGRAM REQUIRES  ISC00640
C     ABOUT 32000 WORDS OF STORAGE.  THIS PROGRAM HAS CURRENTLY LIMITED ISC00650
C     DATA STORAGE TO 43500 WORDS FOR A TOTAL OF 75500 WORDS.           ISC00660
C                                                                       ISC00670
C     THE MAIN ROUTINE OF THIS PROGRAM DYNAMICALLY ALLOCATES STORAGE    ISC00680
C     TO THE CALCULATING SUBROUTINE, MODEL.  MAXIMUM LIMITS ARE NOT     ISC00690
C     LIMITED INDIVIDUALLY TO THE NUMBER OF SOURCES(NSOURC) OR THE      ISC00700
C     NUMBER OF RECEPTORS(NXPNTS*NYPNTS + NXHYPT = NPNTS) OR THE        ISC00710
C     NUMBER OF TIME PERIODS TO BE CALCULATED (NAVG) OR THE NUMBER OF   ISC00720
C     SOURCE GROUPS DESIRED (NGROUP).  INSTEAD THE MAXIMUM LIMIT IS A   ISC00730
C     FUNCTION OF ALL FOUR VARIABLES.  THIS MAXIMUM LIMIT CAN BE        ISC00740
C     COMPUTED WITH THE FOLLOWING EQUATION.                             ISC00750
C                                                                       ISC00760
C     LIMIT = NPNTS*(2+NAVG*NGROUP) + NXPNTS + NYPNTS + 2*NXHYPT        ISC00770
C             + 215*NSOURC + A + B + C                                  ISC00780
C                                                                       ISC00790
C     WHERE A = NPNTS*NGROUP IF ISW(15) = 1; OTHERWISE A = 0 AND        ISC00800
C           B=4*NAVG*NPNTS*NGROUP IF ISW(17) =1 OR                      ISC00810
C           B=6*NAVG*NPNTS*NGROUP IF ISW(17) =2: OTHERWISE B =0 AND     ISC00820
C           C = 201*NAVG*NGROUP IF ISW(18) = 1; OTHERWISE C = 0.        ISC00830
C     ALSO IF NGROUP = 0, ASSUME NGROUP = 1 FOR THE ABOVE EQUATION.     ISC00840
C                                                                       ISC00850
C     THIS LIMIT MUST NOT EXCEED THE VALUE BY WHICH THE 'QF' ARRAY      ISC00860
C     IS DIMENSIONED AND BY WHICH THE VARIABLE, 'LIMIT', IS SET IN      ISC00870
C     THE MAIN ROUTINE.                                                 ISC00880
C                                                                       ISC00890
C     THE AMOUNT OF TIME A PROBLEM RUN TAKES TO EXECUTE CAN BE DESCRIBEDISC00900
C     BY THE FOLLOWING EQUATION.                                        ISC00910
C                                                                       ISC00920
C     # OF MINUTES = CONSTANT*(NDAYS+1)*(1+NHOURS*(1+0.6*NSOURC         ISC00930
C                  *(1+0.6*NPNTS+0.1*NGROUP*NAVG)))                     ISC00940
C                                                                       ISC00950
C     WHERE CONSTANT = 2.1*10**-5.  THIS VALUE IS DERIVED FROM RUNS     ISC00960
C                      MADE ON A UNIVAC 1108 AND WILL VARY FOR OTHER    ISC00970
C                      COMPUTERS.                                       ISC00980
C           NAVG = SUM OF PARAMETERS ISW(7) TO ISW(14) SET TO 1.        ISC00990
C           NPNTS = TOTAL NUMBER OF RECEPTOR POINTS.                    ISC01000
C     ALL OTHER PARAMETERS ARE DEFINED IN INPUT DATA BELOW.             ISC01010
C                                                                       ISC01020
C                                                                       ISC01030
C****************************** INPUT DATA ********************************ISC01040
C                                                                       ISC01050
C     THE INPUT DATA IS PARTITIONED INTO SEVEN MAJOR CARD GROUPS WHERE  ISC01060
C     EACH CARD GROUP CONTAINS COMMON INPUT PARAMETERS.  FOR EXAMPLE,   ISC01070
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C     CARD GROUP 6 CONTAINS ALL SOURCE DATA PARAMETERS.  A CARD GROUP   ISC01080
C     MAY BE DIVIDED INTO 'CARDS'.  A 'CARD' MAY ACTUALLY CONSIST OF    ISC01090
C     MORE THAN ONE CARD IMAGE.  A 'CARD' OR COMPLETE CARD GROUPS MAY   ISC01100
C     NOT BE READ BY THE PROGRAM DEPENDING ON THE PROGRAM OPTIONS       ISC01110
C     CHOSEN BY THE USER.                                               ISC01120
C                                                                       ISC01130
C*****CARD GROUP 1                                                      ISC01140
C                                                                       ISC01150
C*CARD 1  FORMAT(15A4)                                                  ISC01160
C                                                                       ISC01170
C     TITLE - A 60 CHARACTER INFORMATION HEADING WHICH WILL APPEAR AT   ISC01180
C             THE TOP OF EACH PAGE OF OUTPUT.                           ISC01190
C                                                                       ISC01200
C*****CARD GROUP 2                                                      ISC01210
C                                                                       ISC01220
C*CARD 1  FORMAT(40I2)                                                  ISC01230
C                                                                       ISC01240
C     ISW(1) - =1, CALCULATE CONCENTRATION,                             ISC01250
C              =2, CALCULATE DEPOSITION.                                ISC01260
C              IF 0 OR BLANK, 1 IS ASSUMED.                             ISC01270
C     ISW(2) - =1, RECTANGULAR CARTESIAN COORDINATE RECEPTOR GRID       ISC01280
C                  SYSTEM IS ASSUMED.                                   ISC01290
C              =2, POLAR COORDINATE RECEPTOR GRID SYSTEM IS ASSUMED.    ISC01300
C              =3, GENERATE RECTANGULAR CARTESIAN COORDINATE GRID       ISC01310
C              SYSTEM.  GRIDX(1) IS THE STARTING POINT OF THE X-AXIS    ISC01320
C              AND GRIDX(2) IS THE INCREMENTAL VALUE USED IN GENERATING ISC01330
C              THE X-AXIS.  THE Y-AXIS IS GENERATED IN A LIKE MANNER    ISC01340
C              USING GRIDY(1) AND GRIDY(2).                             ISC01350
C              =4, GENERATE POLAR COORDINATE SYSTEM RADIALS.             ISC01360
C              GRIDY(1) IS THE STARTING RADIAL (IN INTEGER DEGREES) AND ISC01370
C              GRIDY(2) IS THE INCREMENTAL INTEGER VALUE USED TO        ISC01380
C              GENERATE THE REMAINING RADIALS.  THE VALUES GENERATED    ISC01390
C              MUST BE WITHIN THE RANGE OF 1 TO 360 DEGREES.            ISC01400
C              IF 0 OR BLANK, 1 IS ASSUMED.                             ISC01410
C     ISW(3) - =1, DISCRETE RECEPTOR POINTS ARE REFERENCED WITH THE     ISC01420
C                  CARTESIAN COORDINATE SYSTEM.                         ISC01430
C              =2, DISCRETE RECEPTOR POINTS ARE REFERENCED WITH THE     ISC01440
C                  POLAR COORDINATE SYSTEM.                             ISC01450
C              IF 0 OR BLANK, 1 IS ASSUMED.                             ISC01460
C     ISW(4) - =0, NO RECEPTOR TERRAIN ELEVATIONS ARE READ.             ISC01470
C              =1, RECEPTOR TERRAIN ELEVATIONS ARE READ. IF = -1, THEN  ISC01480
C                  ELEVATIONS ARE IN METERS RATHER THAN FEET.           ISC01490
C     ISW(5) - =0, NO CONCENTRATIONS OR DEPOSITONS ARE WRITTEN TO TAPE. ISC01500
C              =1, CONCENTRATIONS (DEPOSITIONS) ARE WRITTEN TO TAPE     ISC01510
C              WITH LOGICAL UNIT NUMBER ITAP.  CONCENTRATIONS           ISC01520
C              (DEPOSITIONS) ARE WRITTEN TO TAPE IN THE TIME PERIODS    ISC01530
C              INDICATED BY ISW(7)-ISW(14).  ALSO, AN ANNUAL AVERAGE    ISC01540
C              CONCENTRATION OR TOTAL DEPOSITION IS WRITTEN TO TAPE IF  ISC01550
C              ISW(15) IS SET.  TWO END OF FILE MARKS ARE WRITTEN AT    ISC01560
C              THE END OF THE TAPE.  CONSULT SECTION 3.2.4 OF THE USER'SISC01570
C              MANUAL FOR A DETAILED DISCUSSION OF THIS OPTION.         ISC01580
C     ISW(6) - =0, NO INPUT DATA ARE LISTED.                            ISC01590
C              =1, LIST ALL INPUT DATA.                                 ISC01600
C              =2, LIST ALL INPUT DATA PLUS METEOROLOGICAL DATA.        ISC01610
C     ISW(7) - =1, CALCULATE 1-HOUR TIME PERIODS.                       ISC01620
C     ISW(8) - =1, CALCULATE 2-HOUR TIME PERIODS.                       ISC01630
                                                                        ISC01640
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C     ISW(9) - =1, CALCULATE 3-HOUR TIME PERIODS.                              ISC01650
C     ISW(10) - =1, CALCULATE 4-HOUR TIME PERIODS.                             ISC01660
C     ISW(11) - =1, CALCULATE 6-HOUR TIME PERIODS.                             ISC01670
C     ISW(12) - =1, CALCULATE 8-HOUR TIME PERIODS.                             ISC01680
C     ISW(13) - =1, CALCULATE 12-HOUR TIME PERIODS.                            ISC01690
C     ISW(14) - =1, CALCULATE 24-HOUR TIME PERIODS.                            ISC01700
C     ISW(15) - =1, PRINT AN 'N'-DAY AVERAGE CONCENTRATION OR TOTAL            ISC01710
C               DEPOSITION TABLE FOR ALL RECEPTORS AND FOR EACH SOURCE         ISC01720
C               GROUP.                                                         ISC01730
C     ISW(16) - =1, PRINT DAILY TABLES WHOSE TIME PERIODS ARE                  ISC01740
C               INDICATED BY ISW(7)-ISW(14) FOR EACH RECEPTOR FOR EACH         ISC01750
C               DAY OF METEOROLOGICAL DATA AND FOR EACH SOURCE GROUP.          ISC01760
C     ISW(17) - =1, PRINT TABLES OF HIGHEST AND SECOND HIGHEST                 ISC01770
C               CONCENTRATIONS(DEPOSITIONS) FOR EACH RECEPTOR.  A              ISC01780
C               SET OF THESE TABLES IS PRINTED FOR EACH TIME PERIOD            ISC01790
C               INDICATED BY ISW(7)-ISW(14) AND FOR EACH SOURCE GROUP.         ISC01800
C               IF = 2, A THIRD HIGHEST TABLE IS ALSO PRINTED.                 ISC01810
C     ISW(18) - PRINT THE MAXIMUM 50 CONCENTRATIONS (DEPOSITIONS)              ISC01820
C               FOR EACH TIME PERIOD SPECIFIED BY ISW(7)-ISW(14) AND           ISC01830
C               FOR EACH SOURCE GROUP.                                         ISC01840
C     ISW(19) - =1, PRE-PROCESSED METEOROLOGICAL DATA IS READ ON               ISC01850
C               LOGICAL UNIT IMET.                                             ISC01860
C               =2, METEOROLOGICAL DATA ARE EXPECTED ON CARDS ( NOT            ISC01870
C                   ALLOWED IF REGULATORY DEFAULT OPTION CHOSEN)               ISC01880
C               IF 0 OR BLANK, 1 IS ASSUMED.                                   ISC01890
C     ISW(20) - =0, USE RURAL MODE OPTION.                                     ISC01900
C               =1, USE URBAN MODE 1 OPTION.                                   ISC01910
C               =2, USE URBAN MODE 2 OPTION.                                   ISC01920
C               =3, USE URBAN MODE 3 OPTION-MCELROY-POOLER                     ISC01930
C               NOTE:  IF ISW(19) = 2, THE RURAL MODE OPTION IS USED.          ISC01940
C                      UNLESS ISW(20)=3                                        ISC01950
C     ISW(21) - =1, THE PROGRAM PROVIDES DEFAULT VALUES FOR THE WIND           ISC01960
C                   PROFILE EXPONENTS.  THESE VALUES ARE .15,.15,.2,.25,ISC01970
C                  .3,.3 FOR URBAN  AND .07,.07,.1,.15,.35,.55                ISC01980
C                  FOR RURAL FOR EACH OF THE SIX STABILITY                    ISC01990
C                  AND FOR ALL THE WIND SPEED CATEGORIES.                     ISC02000
C               =2, ENTER WIND PROFILE EXPONENTS IN CARD GROUP 5, CARDS ISC02010
C                   1-6.  THESE VALUES ARE USED THROUGHOUT THE DATA            ISC02020
C                   CASE.  SEE CARD GROUP 5.                                   ISC02030
C               =3, THE PROGRAM READS ALL WIND PROFILE EXPONENTS ON AN ISC02040
C                   HOUR-TO-HOUR BASIS IN CARD GROUP 7.  SEE CARD GROUP ISC02050
C                   7.  NOTE THAT THIS OPTION IS APPLICABLE ONLY IF        ISC02060
C                   HOURLY METEOROLOGICAL DATA IS CARD INPUT (ISW(19)      ISC02070
C                   EQUALS 2).                                             ISC02080
C               DEFAULT VALUE EQUALS 1.                                    ISC02090
C     ISW(22) - =1, THE PROGRAM PROVIDES DEFAULT VALUES FOR THE VERTICALISC02100
C                   POTENTIAL TEMPERATURE GRADIENTS.  THESE VALUES ARE     ISC02110
C                   0.0,0.0,0.0,0.0,0.0,0.02,0.035 FOR EACH OF THE SIX     ISC02120
C                   STABILITY CATEGORIES AND FOR ALL WIND SPEED            ISC02130
C                   CATEGORIES.                                            ISC02140
C               =2, ENTER VERTICAL POTENTIAL TEMPERATURE GRADIENTS IN      ISC02150
C                   CARD GROUP 5, CARDS 7-12.  THE VALUES ARE USED         ISC02160
C                   THROUGHOUT THE DATA CASE.  SEE CARD GROUP 5.           ISC02170
C               =3, THE PROGRAM READS ALL VERTICAL POTENTIAL TEMPERATUREISC02180
C                   GRADIENTS ON AN HOUR-TO-HOUR BASIS IN CARD GROUP 7. ISC02190
C                   SEE CARD GROUP 7.  NOTE THAT THIS OPTION IS            ISC02200
C                   APPLICABLE ONLY IF HOURLY METEOROLOGICAL DATA IS       ISC02210
```

```
C                CARD INPUT (ISW(19) EQUALS 2).                          ISC02220
C              DEFAULT VALUE EQUALS 1.                                   ISC02230
C     ISW(23) - THIS PARAMETER ALLOWS THE SCALING OF SOURCE EMISSION      ISC02240
C              RATES AS A FUNCTION OF SEASON, MONTH, HOUR OF THE DAY     ISC02250
C              WIND SPEED AND STABILITY, OR A COMBINATION OF BOTH        ISC02260
C              SEASONAL AND HOUR OF THE DAY VARIANCE.  IF THIS PARA-     ISC02270
C              METER IS GREATER THAN ZERO THEN THE SOURCE EMISSION       ISC02280
C              RATES (Q) FOR ALL SOURCES ARE ADJUSTED DEPENDING ON       ISC02290
C              WHICH OPTION IS CHOSEN.  ALSO, THE USE OF THIS PARAMETER  ISC02300
C              OVERRIDES THE INPUT PARAMETER QFLG (SEE CARD GROUP 6).    ISC02310
C              OTHERWISE IF ISW(23) EQUALS ZERO THEN THE SOURCE          ISC02320
C              EMISSION RATES FOR A GIVEN SOURCE MAY BE SCALED USING     ISC02330
C              THE CORRESPONDING QFLG PARAMETER FOR THAT SOURCE.  SET    ISC02340
C              ISW(23) TO THE VALUE ACCORDING TO THE LIST OF OPTIONS     ISC02350
C              BELOW.  THESE SAME OPTIONS ARE USED BY THE QFLG PARA-     ISC02360
C              METER FOR EACH SOURCE.  THE SCALING FACTOR VALUES ARE     ISC02370
C              ENTERED IN CARD GROUP 6, CARD 5 AND IN A FORMAT           ISC02380
C              DEPENDING ON WHICH OPTION IS SELECTED FROM ISW(23) (OR    ISC02390
C              QFLG).                                                    ISC02400
C              =0, NO SCALING OF THE SOURCE EMISSION RATES FOR ALL       ISC02410
C                  SOURCES IS PERFORMED (EQUIVALENT TO MULTIPLYING       ISC02420
C                  SOURCE STRENGTH, Q, BY 1.0).  SCALING OF INDIVIDUAL   ISC02430
C                  SOURCE EMISSION RATES OF SOURCES MAY STILL BE         ISC02440
C                  EXERCISED BY THE INPUT PARAMETER QFLG (SEE CARD       ISC02450
C                  GROUP 6).                                             ISC02460
C              =1, SCALE SOURCE EMISSION RATES ACCORDING TO SEASON.      ISC02470
C                  INPUT FOUR SCALARS IN CARD GROUP 6, CARD 5 FOR THE    ISC02480
C                  WINTER, SPRING, SUMMER AND AUTUMN SEASONS.  A SEASON  ISC02490
C                  IS DETERMINED FROM THE JULIAN DAY OF A 366-DAY YEAR.  ISC02500
C                  WINTER INCLUDES JULIAN DAYS 336-60, SPRING 61-152,    ISC02510
C                  SUMMER 153-244 AND AUTUMN 245-335.  THESE JULIAN      ISC02520
C                  DAYS, FOR EACH SEASON, CORRESPOND WITH THE 3 MONTHS   ISC02530
C                  OF EACH METEOROLOGICAL SEASON.                        ISC02540
C              =2, SCALE SOURCE EMISSION RATES ACCORDING TO MONTH.       ISC02550
C                  INPUT TWELVE SCALARS IN CARD GROUP 6, CARD 5 FOR      ISC02560
C                  EACH MONTH OF THE YEAR BEGINNING WITH JANUARY AND     ISC02570
C                  PROCEEDING THROUGH THE YEAR TO DECEMBER.  A MONTH IS  ISC02580
C                  DETERMINED FROM THE JULIAN DAY OF A 366-DAY YEAR.     ISC02590
C              =3, SCALE SOURCE EMISSION RATES BY HOUR OF THE DAY.       ISC02600
C                  INPUT 24 SCALARS IN CARD GROUP 6, CARD 5 BEGINNING    ISC02610
C                  WITH HOUR 1 FOR EACH HOUR OF THE DAY.                 ISC02620
C              =4, SCALE SOURCE EMISSION RATES DEPENDING ON BOTH THE     ISC02630
C                  WIND SPEED AND STABILITY CATEGORY VALUES FOR A GIVEN  ISC02640
C                  HOUR OF METEOROLOGICAL DATA.  INPUT SIX SETS OF SIX   ISC02650
C                  SCALARS FOR EACH OF THE SIX STABILITY CATEGORIES       ISC02660
C                  (A-F) BEGINNING WITH STABILITY CATEGORY A(=1).  FOR    ISC02670
C                  EACH OF THE SIX SETS, SIX SCALARS ARE ENTERED FOR      ISC02680
C                  EACH WIND SPEED CATEGORY BEGINNING WITH THE LOWEST     ISC02690
C                  WIND SPEED CATEGORY.  HENCE, A TOTAL OF 36 SCALARS     ISC02700
C                  ARE ENTERED IN CARD GROUP 6, CARD 5.                   ISC02710
C              =5, SCALE SOURCE EMISSION RATES DEPENDING ON BOTH SEASON   ISC02720
C                  AND HOUR OF THE DAY.  INPUT FOUR SETS OF 24 SCALARS   ISC02730
C                  FOR EACH OF THE FOUR SEASONS BEGINNING WITH WINTER     ISC02740
C                  AND FOLLOWED BY SPRING, SUMMER AND AUTUMN.  A TOTAL    ISC02750
C                  OF 96 SCALARS ARE ENTERED IN CARD GROUP 6, CARD 5.     ISC02760
C     ISW(24) - =1, PROGRAM USES FINAL PLUME RISE AT ALL RECEPTOR LOCA-    ISC02770
C                  TIONS.  RECEPTOR LOCATION IS NOT A FUNCTION OF THE     ISC02780
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C                  PLUME RISE WITH THIS OPTION.                          ISC02790
C                =2, PROGRAM COMPUTES PLUME RISE AS A FUNCTION OF THE    ISC02800
C                  DOWNWIND DISTANCE (RECEPTOR LOCATION).                ISC02810
C                DEFAULT VALUE EQUALS 1.                                 ISC02820
C     ISW(25) - =1, DO NOT MODIFY THE PHYSICAL STACK HEIGHT TO ACCOUNT   ISC02830
C                  FOR DOWNWASH.                                         ISC02840
C                =2, MODIFY THE PHYSICAL STACK HEIGHT FOR ALL STACKS TO  ISC02850
C                  ACCOUNT FOR STACK DOWNWASH ACCORDING TO               ISC02860
C                  BRIGGS, 1973.                                         ISC02870
C                DEFAULT VALUE EQUALS 1.                                 ISC02880
C     ISW(26) - =1, PROGRAM USES BUOYANCY INDUCED DIPERSION IN THE       ISC02890
C                   SIGMA-Y AND SIGMA-Z TERMS.                           ISC02900
C                =2, PROGRAM DOES NOT INCLUDE BUOYANCY INDUCED DISPERSIONISC02910
C     ISW(27) - =1, PROGRAM USES A SUBPROGRAM TO SET                     ISC02920
C                  CONCENTRATIONS FOR CALM PERIODS EQUAL TO ZERO.        ISC02930
C                  IF CARD MET DATA(ISW(19)=2) ISW(27) IS SET TO 2       ISC02940
C                =2, PROGRAM DOES NOT USE A SUBPROGRAM TO SET            ISC02950
C                  CONCENTRATIONS FOR CALM PERIODS EQUAL TO              ISC02960
C                  ZERO.                                                 ISC02970
C    ISW(28) - =1, A REGULATORY DEFAULT MODE IS USED. NOTE, IF THIS      ISC02980
C                  OPTION IS SELECTED METEOROLOGY MUST BE INPUT          ISC02990
C                  VIA PRE-PROCESSED TAPE/FILE. IF THE USER              ISC03000
C                  ATTEMPTS TO RUN THE MODEL WITH THE REGULATORY         ISC03010
C                  DEFAULT OPTION AND CARD METEOROLOGY, AN               ISC03020
C                  ABNORMAL TERMINATION WILL RESULT.                     ISC03030
C                  IF CHOSEN, THIS OPTION WILL CAUSE VARIOUS MODEL       ISC03040
C                  OPTIONS TO BE OVERRIDEN WITH EPA RECOMMENDED VALUES.  ISC03050
C                  THE FOLLOWING OPTIONS ARE CHANGED:                    ISC03060
C                  TAPE/FILE PRE-PROCESSED METEOROLOGY ASSUMED.          ISC03070
C                  FINAL PLUME RISE IS USED.                             ISC03080
C                  BUOYANCY INDUCED DISPERSION IS USED.                  ISC03090
C                  STACK TIP DOWNWASH IS USED.                           ISC03100
C                  DEFAULT WIND PROFILE COEFFICIENTS FOR RURAL           ISC03110
C                  MODE(.07,.07,.10,.15,.35,.55) AND URBAN               ISC03120
C                  MODE(.15,.15,.20,.25,.30,.30) FOR STABILITY           ISC03130
C                  CLASSES A-F ARE ASSIGNED.                             ISC03140
C                  DEFAULT VERTICAL POTENTIAL TEMPERATURE GRADIENTS      ISC03150
C                  (A 0.0, B 0.0, C 0.0, D 0.0, E .02, F .035 K/M)       ISC03160
C                  A DECAY HALF LIFE OF 4 HOURS IS ASSIGNED IF           ISC03170
C                  SO2 IS MODELLED AND THE URBAN MODE IS                 ISC03180
C                  DESIRED. OTHERWISE THE DECAY HALF LIFE IS             ISC03190
C                  SET TO INFINITY (NO DECAY).                           ISC03200
C                =2, PROGRAM DOES NOT USE A REGULATORY DEFAULT MODE.     ISC03210
C     ISW(29) - =1, IF SO2 IS MODELLED. NOTE THAT IF THE RUN IS          ISC03220
C                  URBAN AND THE REG. DEFAULT OPTION IS CHOSEN           ISC03230
C                  A HALF LIFE OF 4 HOURS IS ASSIGNED.                   ISC03240
C                =2, IF POLLUTANT OTHER THAN SO2 IS MODELLED.            ISC03250
C     ISW(30) - =1, DEBUG MODE IS CALLED. ALL CARD INPUT IS              ISC03260
C                  ECHOED AS SOON AS IT IS READ. THIS                    ISC03270
C                  OPTION IS USEFUL WHEN INPUT ERRORS ARE                ISC03280
C                  DETECTED.                                             ISC03290
C              =2, DEBUG MODE NOT CALLED.                                ISC03300
C                                                                        ISC03310
C*CARD 2  FORMAT(8I6)                                                    ISC03320
C                                                                        ISC03330
C     NSOURC - NUMBER OF SOURCES                                         ISC03340
C     NXPNTS - NUMBER OF X POINTS IN THE X-AXIS FOR A CARTESIAN          ISC03350
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C              COORDINATE RECEPTOR GRID OR THE NUMBER OF RANGES (RINGS) ISC03360
C              FOR A POLAR COORDINATE RECEPTOR GRID.                    ISC03370
C      NYPNTS - NUMBER OF Y POINTS IN THE Y-AXIS FOR A CARTESIAN        ISC03380
C              COORDINATE RECEPTOR GRID OR THE NUMBER OF DIRECTIONS     ISC03390
C              (RADIALS) FOR A POLAR COORDINATE GRID.                   ISC03400
C      NXWYPT - NUMBER OF DISCRETE OR ARBITRARILY PLACED RECEPTORS.     ISC03410
C      NGROUP - NUMBER OF SOURCE GROUPS.  EACH SOURCE GROUP IS A        ISC03420
C              SELECTED NUMBER OF SOURCES SPECIFIED BY THE USER (SEE    ISC03430
C              DATA CARD GROUP 4) FROM THE NUMBER OF SOURCES            ISC03440
C              PROCESSED IN THE PROBLEM RUN.  THE CONCENTRATION OR      ISC03450
C              DEPOSITION CONTRIBUTED COLLECTIVELY BY THE SOURCES       ISC03460
C              IN EACH SOURCE GROUP IS COMPUTED AND PRINTED DEPENDING   ISC03470
C              ON THE OPTIONS SELECTED IN DATA CARD GROUP 2, CARD 1.    ISC03480
C              IF LEFT BLANK OR ZERO, THE PROGRAM WILL SUM OVER ALL     ISC03490
C              SOURCES.  MAXIMUM EQUALS 150 SOURCE GROUPS.              ISC03500
C      IPERD - THIS PARAMETER ALLOWS THE USER TO SPECIFY AN N-TH TIME   ISC03510
C              PERIOD FOR WHICH CONCENTRATIONS OR DEPOSITIONS ARE        ISC03520
C              PRINTED.  THIS PARAMETER IS USED IN CONJUNCTION WITH THE ISC03530
C              ISW(7) - ISW(14) OPTIONS.  FOR EXAMPLE, IF ONE DESIRES TO ISC03540
C              SEE THE FIFTH 3-HOUR PERIOD OF AVERAGE CONCENTRATION (OR  ISC03550
C              TOTAL DEPOSITION) THEN IPERD IS SET TO 5 AND ISW(8) IS SETISC03560
C              TO 1.  ALSO, ANY INVALID COMBINATIONS OF IPERD AND THE    ISC03570
C              TIME PERIOD ISW OPTIONS ARE IGNORED.  EXAMPLES OF THESE   ISC03580
C              ARE A FIFTH 24-HOUR TIME PERIOD OR A FOURTH 8-HOUR TIME   ISC03590
C              PERIOD.                                                   ISC03600
C                                                                        ISC03610
C      NOTE:  THE FOLLOWING 2 INPUT PARAMETERS ARE USED ONLY IF          ISC03620
C             METEOROLOGICAL DATA ARE CARD INPUT (ISW(19)=2).            ISC03630
C      NHOURS - NUMBER OF HOURS PER DAY OF METEOROLOGICAL DATA.          ISC03640
C      NDAYS - NUMBER OF DAYS OF METEOROLOGICAL DATA.                    ISC03650
C              IF 0 OR BLANK, NDAYS IS SET TO 1.                         ISC03660
C*****CARD GROUP 3                                                       ISC03670
C         CARDS 1-3 FOR GRID TYPE RECEPTORS                              ISC03680
C                                                                        ISC03690
C                                                                        ISC03700
C*CARD 1  FORMAT(8F10.0) THIS CARD IS NOT READ IF NXPNTS OR NYPNTS = 0.  ISC03710
C                                                                        ISC03720
C      GRIDX - IF ISW(2)=1, X-AXIS RECEPTOR ARRAY IN METERS.             ISC03730
C              IF ISW(2) = 2 OR 4, RECEPTOR RANGE(RING) ARRAY IN METERS. ISC03740
C              IF ISW(2)=3, GRIDX(1) IS THE STARTING LOCATION FOR THE    ISC03750
C              X-AXIS IN METERS AND GRIDX(2) IS THE INCREMENT AT WHICH   ISC03760
C              THE X-AXIS IS GENERATED IN METERS.                        ISC03770
C                                                                        ISC03780
C*CARD 2  FORMAT(8F10.0) THIS CARD IS NOT READ IF NXPNTS OR NYPNTS = 0.  ISC03790
C                                                                        ISC03800
C      GRIDY - IF ISW(2)=1, Y-AXIS RECEPTOR ARRAY IN METERS.             ISC03810
C              IS ISW(2)=2, RECEPTOR DIRECTION(RADIAL) ARRAY IN INTEGER  ISC03820
C              DEGREE VALUES WITHIN THE RANGE OF 1 TO 360 DEGREES.       ISC03830
C              DEFAULT VALUE = 360 DEGREES.                              ISC03840
C              IF ISW(2)=3, GRIDY(1) IS THE STARTING LOCATION FOR THE    ISC03850
C              Y-AXIS IN METERS AND GRIDY(2) IS THE INCREMENT AT WHICH   ISC03860
C              THE Y-AXIS IS GENERATED IN METERS.                        ISC03870
C              IF ISW(2)=4, GRIDY(1) IS THE STARTING DIRECTION(RADIAL)   ISC03880
C              IN INTEGER DEGREES AND GRIDY(2) IS THE INTEGER INCREMENT  ISC03890
C              AT WHICH THE RADIALS ARE GENERATED IN DEGREES.  THE       ISC03900
C              VALUES GENERATED MUST BE WITHIN THE RANGE OF 1 TO 360     ISC03910
C                                                                        ISC03920
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C            DEGREES.                                                    ISC03930
C            DEFAULT VALUE = 360 DEGREES.                                ISC03940
C                                                                        ISC03950
C*CARD 3  FORMAT(8F10.0) THIS CARD IS READ ONLY IF ISW(4) = 1 OR -1      ISC03960
C         AND NXPNT AND NYPNTS ARE BOTH NON-ZERO.                        ISC03970
C                                                                        ISC03980
C     GRIDZ - ARRAY OF TERRAIN ELEVATIONS FOR RECEPTORS IN FEET.         ISC03990
C             FOR EACH Y-AXIS (OR RADIALS) AN X-AXIS (OR RANGE) ARRAY    ISC04000
C             IS READ.  FOR EACH X-AXIS ARRAY READ, A NEW CARD IMAGE IS  ISC04010
C             STARTED.                                                   ISC04020
C                                                                        ISC04030
C                                                                        ISC04040
C*CARD 4  FORMAT(3F10.0) FOR DISCRETE RECEPTORS.                         ISC04050
C             THIS CARD REPLACES CARDS 3                                 ISC04060
C             AND 4 FROM UNAMAP VERSION 5. THIS CARD                     ISC04070
C             IS ONLY READ IF NXNYPT IS NON-ZERO.  INPUT                 ISC04080
C             XDIS, YDIS, GRIDZ ON 1 CARD. THERE IS 1                    ISC04090
C             CARD FOR EACH DISCRETE RECEPTOR.                           ISC04100
C             IF TERRAIN ELEVATIONS ARE NOT CONSIDERED                   ISC04110
C             LEAVE THE LAST ENTRY ON EACH CARD BLANK.                   ISC04120
C             NXNYPT CARDS MUST BE INPUT.                                ISC04130
C                                                                        ISC04140
C     XDIS - IF ISW(3)=1,  X VALUE IN METERS FOR DISCRETE                ISC04150
C            RECEPTORS.                                                  ISC04160
C            IF ISW(3)=2,  RANGE IN METERS FOR DISCRETE                  ISC04170
C            RECEPTORS.                                                  ISC04180
C                                                                        ISC04190
C     YDIS - IF ISW(3)=1,  Y VALUE IN METERS FOR DISCRETE                ISC04200
C            RECEPTORS.                                                  ISC04210
C            IF ISW(3)=2,  DIRECTION(RADIAL) IN INTEGER                  ISC04220
C            DEGREE VALUES FOR DISCRETE RECEPTORS.  VALUES MUST BE       ISC04230
C            WITHIN 1 TO 360 DEGREES.                                    ISC04240
C            DEFAULT VALUE = 360 DEGREES.                                ISC04250
C                                                                        ISC04260
C     GRIDZ -  TERRAIN ELEVATION FOR DISCRETE                            ISC04270
C              RECEPTORS IN FEET. NOTE ONLY 1 GRIDZ VALUE                ISC04280
C              IS READ FROM EACH DISCRETE RECEPTOR CARD.                 ISC04290
C                                                                        ISC04300
C                                                                        ISC04310
C*****CARD GROUP 4  THIS CARD GROUP IS NOT READ IF NGROUP = 0.           ISC04320
C                                                                        ISC04330
C*CARD 1  FORMAT(20I4)                                                   ISC04340
C                                                                        ISC04350
C     NSOGRP - AN ARRAY OF INTEGERS INDICATING HOW MANY SOURCE NUMBERS   ISC04360
C              ARE TO BE READ FOR EACH SOURCE GROUP.  THE SOURCE NUMBERS ISC04370
C              ARE READ IN THE ARRAY IDSOR.  SEE CARD 2 BELOW FOR AN     ISC04380
C              EXAMPLE OF THIS PARAMETER'S USE AND FOR THE EXPLANATION   ISC04390
C              OF THE PARAMETER IDSOR WHICH IS USED IN CONJUNCTION WITH  ISC04400
C              NSOGRP.  A MAXIMUM OF 150 VALUES MAY BE INPUT.            ISC04410
C                                                                        ISC04420
C*CARD 2  FORMAT(13I6)                                                   ISC04430
C                                                                        ISC04440
C     IDSOR - AN INTEGER ARRAY CONTAINING THE SOURCE NUMBERS OR, THE     ISC04450
C             LOWER AND UPPER BOUND OF SOURCE NUMBERS TO BE SUMMED       ISC04460
C             TOGETHER.  THIS PARAMETER IS USED IN CONJUNCTION WITH      ISC04470
C             THE ARRAY NSOGRP IN CARD 1 ABOVE.  THE FOLLOWING EXAMPLE   ISC04480
C             SHOULD ILLUSTRATE THE USE OF THE PARAMETERS NGROUP (SEE    ISC04490
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C             DATA CARD GROUP 2), NSOGRP AND IDSOR.  LET US ASSUME THAT ISC04500
C             WE HAVE 50 SOURCES WHOSE NUMBERS ARE 10,20,30,...,490,500.ISC04510
C             FIRST, IF THE USER DESIRES TO SEE THE CONCENTRATION (OR   ISC04520
C             DEPOSITION) FROM ALL SOURCES IN THE PROBLEM RUN, NAMELY,  ISC04530
C             THE 50 MENTIONED ABOVE THEN SET NGROUP TO 0.  THE         ISC04540
C             PARAMETERS NSOGRP AND IDSOR WOULD NOT BE INPUT.  INSTEAD  ISC04550
C             LET US SUPPOSE THAT WE DESIRE TO SEE THE CONCENTRATION    ISC04560
C             (OR DEPOSITION) INDIVIDUALLY FROM SOURCES 10, 100, 200,   ISC04570
C             300, 400 AND 500.  WE ALSO WISH TO SEE THE COMBINED       ISC04580
C             CONTRIBUTION FROM SOURCES 10 THROUGH 100; 50 THROUGH 260; ISC04590
C             100 THROUGH 200 PLUS 400 THROUGH 500; AND FINALLY ALL     ISC04600
C             SOURCES 10 THROUGH 500.  HENCE, THE CONCENTRATION (OR     ISC04610
C             (DEPOSITION) CONTRIBUTIONS FROM SIX INDIVIDUAL SOURCES    ISC04620
C             ARE DESIRED PLUS THE CONTRIBUTION FROM FOUR SETS OF       ISC04630
C             COMBINED SOURCES ARE DESIRED FOR A TOTAL OF TEN SOURCE    ISC04640
C             GROUPS.  THUS, ENTER THE VALUE 10 FOR NGROUP.  FOR NSOGRP ISC04650
C             ONE WOULD ENTER 1,1,1,1,1,1,2,2,4,2.  FOR THE IDSOR ARRAY ISC04660
C             ONE WOULD ENTER 10,100,200,300,400,500,10,-100,50,-260,   ISC04670
C             100,-200,400,-500,10,-500.  THE FIRST SIX ENTRIES OF BOTH ISC04680
C             NSOGRP AND IDSOR ARE IN A ONE-TO-ONE CORRESPONDENCE; THE  ISC04690
C             1 ENTERED IN NSOGRP IMPLIES THAT ONLY ONE SOURCE NUMBER   ISC04700
C             NEED BE READ IN THE IDSOR ARRAY FOR A COMPLETE SOURCE     ISC04710
C             GROUP CONTRIBUTION.  THE SEVENTH ENTRY IN NSOGRP, A 2,    ISC04720
C             INDICATES THAT THE SOURCE NUMBERS 10 AND -100 ARE TO BE   ISC04730
C             CONSIDERED FOR A SOURCE GROUP WHILE THE MINUS SIGN        ISC04740
C             INDICATES INCLUSIVE SUMMING FROM SOURCES 10 TO 100.  ONE  ISC04750
C             NEED NOT BE CONCERNED BY THE FACT THAT NO SOURCE NUMBER   ISC04760
C             OF, SAY, '43' EXISTS.  THE PROGRAM ONLY SUMS OVER THOSE   ISC04770
C             SOURCES DEFINED, NAMELY IN THIS CASE 10,20,30,...,90,100. ISC04780
C             LIKEWISE, ENTRY EIGHT IN NSOGRP, A 2, CALLS FOR A SOURCE  ISC04790
C             GROUP INCLUDING SOURCES 50 THROUGH 260.  IF ONE DESIRES   ISC04800
C             SOURCE CONTRIBUTIONS FROM SOURCES BUT NOT FROM SOURCES    ISC04810
C             BETWEEN, THE NINTH ENTRY IN NSOGRP, A 4, ILLUSTRATES     ISC04820
C             THIS PROCEDURE.  THE FOUR IMPLIES THAT FOUR SOURCE NUMBERSISC04830
C             NEED BE READ IN ORDER TO DEFINE A SOURCE GROUP.  IN THIS  ISC04840
C             CASE THE FOUR SOURCE NUMBERS READ ARE 100,-200,400,-500   ISC04850
C             IMPLYING THAT THE INCLUSIVE SUMMATION OVER SOURCES 100    ISC04860
C             TO 200 AND 400 TO 500 ARE DESIRED EXCLUDING SOURCE        ISC04870
C             NUMBERS 210 THROUGH 390.  FINALLY, IT IS STILL POSSIBLE   ISC04880
C             TO OBTAIN THE COMBINED CONTRIBUTION FROM ALL SOURCES IN   ISC04890
C             THE PROBLEM RUN AS SHOWN IN THE LAST SOURCE GROUP.        ISC04900
C             IN SUMMARY; 1) NGROUP IS A VALUE USED TO REPRESENT THE    ISC04910
C             NUMBER OF SOURCE GROUPS DESIRED; 2) THE VALUES IN NSOGRP  ISC04920
C             INDICATE THE NUMBER OF SOURCE NUMBERS TO BE READ IN IDSOR;ISC04930
C             AND 3) IDSOR CONTAINS THE SOURCE NUMBERS USED TO          ISC04940
C             CONSTITUTE A SOURCE GROUP WHERE A MINUS SIGN IMPLIES      ISC04950
C             INCLUSIVE SUMMING FROM THE PREVIOUS SOURCE NUMBER ENTERED ISC04960
C             TO THE SOURCE NUMBER WITH THE MINUS SIGN.                 ISC04970
C             THE NUMBER OF VALUES CAN NOT EXCEED 200 IN THE IDSOR      ISC04980
C             ARRAY.                                                    ISC04990
C                                                                       ISC05000
C*****CARD GROUP 5                                                      ISC05010
C                                                                       ISC05020
C*CARDS 1-6  FORMAT(6F10.0)  THESE CARDS ARE READ ONLY IF ISW(21) IN     ISC05030
C                           CARD GROUP 2 EQUALS 2 AND  ISW(28) NE 1     ISC05040
C                                                                       ISC05050
C     PDEF - ENTER WIND PROFILE EXPONENTS FOR SIX STABILITY CATEGORIES  ISC05060
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C           (A-F) AND SIX WIND SPEED CATEGORIES (ENTERED IN UCATS IN   ISC05070
C           CARD 13 BELOW).  FOR EACH STABILITY CATEGORY, BEGINNING    ISC05080
C           WITH STABILITY CATEGORY A, ENTER SIX WIND PROFILE EXPONENTSISC05090
C           FOR EACH WIND SPEED CATEGORY ON ONE CARD.  A TOTAL OF SIX  ISC05100
C           CARDS ARE READ FOR A TOTAL OF 36 VALUES.                   ISC05110
C                                                                      ISC05120
C*CARDS 7-12  FORMAT(6F10.0)  THESE CARDS ARE READ ONLY IF ISW(22) IN  ISC05130
C                             CARD GROUP 2 EQUALS 2 AND ISW(28) NE 1   ISC05140
C                                                                      ISC05150
C     DTHDEF - ENTER VERTICAL POTENTIAL TEMPERATURE GRADIENTS (DEGREES ISC05160
C              KELVIN/METER) FOR SIX STABILITY CATEGORIES (A-F) AND     ISC05170
C              SIX WIND SPEED CATEGORIES (ENTERED IN UCATS IN DATA CARD ISC05180
C              13 BELOW).  FOR EACH STABILITY CATEGORY, BEGINNING WITH  ISC05190
C              STABILITY CATEGORY A, ENTER SIX GRADIENT VALUES ON ONE   ISC05200
C              CARD.  A TOTAL OF SIX CARDS ARE READ FOR A TOTAL OF 36   ISC05210
C              VALUES.                                                  ISC05220
C                                                                       ISC05230
C*CARD 13  FORMAT(6F10.0)                                               ISC05240
C                                                                       ISC05250
C     ZR - HEIGHT AT WHICH THE WIND SPEED WAS MEASURED (METERS).        ISC05260
C          DEFAULT ASSUMES 10.0 METERS.                                 ISC05270
C     UCATS - INPUT THE UPPER BOUND OF THE FIRST THROUGH FIFTH WIND     ISC05280
C             SPEED CATEGORIES IN METERS PER SECOND.  DEFAULT VALUES    ISC05290
C             EQUAL 1.54, 3.09, 5.14, 8.23, 10.80 RESPECTIVELY.         ISC05300
C                                                                       ISC05310
C*CARD 14  FORMAT(E8.0,1F8.0,3A4,7A4,2I2)                               ISC05320
C                                                                       ISC05330
C     TK - SOURCE EMISSION RATE UNITS CONVERSION FACTOR.  IF 0 OR BLANK,ISC05340
C          TK IS SET TO 10**6 FOR CONCENTRATION AND 1.0 FOR DEPOSITION. ISC05350
C     DECAY - WASHOUT COEFFICIENT FOR PRECIPITATION SCAVENGING.  IF 0   ISC05360
C             OR BLANK, NO SCAVENGING IS ASSUMED.  THE VALUE ENTERED    ISC05370
C             FOR THIS PARAMETER IS IGNORED BY THE PROGRAM IF CARD      ISC05380
C             METEOROLOGICAL DATA ARE INPUT (ISW(19)=2).                ISC05390
C             NOTE THAT IF THE REG. DEFAULT OPTION IS CHOSEN            ISC05400
C             AND SO2 IS MODELLED IN AN URBAN MODE THE DECAY            ISC05410
C             TERM IS SET = TO .000048(4 HR HALF LIFE).                 ISC05420
C     IQUN - 12 CHARACTERS IDENTIFYING EMISSION RATE (Q) UNITS.  IF     ISC05430
C            BLANK, EMISSION RATE IS ASSUMED IN (GRAM/SEC) FOR          ISC05440
C            CONCENTRATION AND (GRAMS) FOR DEPOSITION.                  ISC05450
C     ICHIUN - 28 CHARACTERS IDENTIFYING OUTPUT UNITS.  IF BLANK, OUTPUTISC05460
C              FOR CONCENTRATION IS (MICROGRAMS/CUBIC METER) AND FOR    ISC05470
C              DEPOSITION IS (GRAMS/SQUARE METER).                      ISC05480
C     IMET - LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA.  DEFAULT VALUE ISC05490
C            EQUALS 9 FOR PREPROCESSED DATA (ISW(19)=1), AND EQUALS 5   ISC05500
C            (CURRENT VALUE OF INTERNAL VARIABLE 'IN') FOR CARD DATA    ISC05510
C            (ISW(19)=2).                                               ISC05520
C     ITAP - LOGICAL UNIT NUMBER OF TAPE OUTPUT OPTION.  IF 0 OR BLANK, ISC05530
C            ITAP IS SET TO 3.                                          ISC05540
C                                                                       ISC05550
C*CARDS 15-19  FORMAT(80I1)  THESE CARDS ARE READ ONLY IF PRE-PROCESSED ISC05560
C                            METEOROLOGICAL DATA ARE USED (ISW(19)=1).  ISC05570
C                                                                       ISC05580
C     IDAY - ARRAY OF 366 INDICATING WHICH DAYS OF METEOROLOGY ARE TO   ISC05590
C            BE USED BY THE PROGRAM.  FOR EXAMPLE, IF DAY(140)=1 THEN   ISC05600
C            DAY 140 WILL BE USED ALONG WITH ANY OTHER VALUES SET TO 1. ISC05610
C                                                                       ISC05620
C*CARD 20  FORMAT(4I6)  THIS CARD IS READ ONLY IF PRE-PROCESSED         ISC05630
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C                    METEOROLOGICAL DATA ARE USED (ISW(19)=1).                  ISC05640
C                                                                               ISC05650
C     ISS - SURFACE STATION NUMBER TO BE MATCHED WITH NUMBER READ FROM          ISC05660
C           METEOROLOGICAL DATA.                                                ISC05670
C     ISY - YEAR OF SURFACE DATA, A TWO DIGIT INTEGER.                          ISC05680
C     IUS - UPPER AIR STATION NUMBER TO BE MATCHED WITH NUMBER READ             ISC05690
C           FROM METEOROLOGICAL DATA.                                           ISC05700
C     IUY - YEAR OF UPPER AIR DATA, A TWO DIGIT NUMBER.                         ISC05710
C                                                                               ISC05720
C*****CARD GROUP 6                                                              ISC05730
C                                                                               ISC05740
C*CARD 1  FORMAT(I5,2I1,I2,I1,F8.0,2F7.0,8F6.0)  THIS CARD IS REPEATED          ISC05750
C                                                 'NSOURC' TIMES.               ISC05760
C                                                                               ISC05770
C     NSO - SOURCE IDENTIFICATION NUMBER.  MUST BE A POSITIVE NUMBER.           ISC05780
C     ITYPE - =0, STACK TYPE SOURCE.                                            ISC05790
C             =1, VOLUME TYPE SOURCE.                                           ISC05800
C             =2, AREA TYPE SOURCE.                                             ISC05810
C     WAKE - STACK WAKE EFFECTS OPTION FOR CHOOSING WHICH SIGMA Y               ISC05820
C            EQUATION TO USE.                                                   ISC05830
C            =0, 'UPPER BOUND' CONCENTRATION IS CALCULATED.                     ISC05840
C            =1, 'LOWER BOUND' CONCENTRATION IS CALCULATED.                     ISC05850
C            DEFAULT ASSUMES 0.                                                 ISC05860
C            REFER TO SECTION 2.4.1.D OF THE USER'S GUIDE FOR A MORE            ISC05870
C            COMPLETE DISCUSSION OF THIS OPTION.                                ISC05880
C     NVS - NUMBER OF GRAVITATIONAL SETTLING CATEGORIES.  MAXIMUM OF            ISC05890
C           20.  IF > 0, CARDS 2-4 BELOW ARE READ IMMEDIATELY FOLLOWING         ISC05900
C           THIS SOURCE INPUT CARD.                                             ISC05910
C     QFLG - THIS PARAMETER ALLOWS THE SCALING OF THE SOURCE EMISSION           ISC05920
C            RATE FOR THIS SOURCE AS A FUNCTION OF SEASON, MONTH, HOUR          ISC05930
C            OF THE DAY, WIND SPEED AND STABILITY, OR A COMBINATION OF          ISC05940
C            BOTH SEASONAL AND HOUR OF THE DAY VARIANCE.  IF THE PARA-          ISC05950
C            METER ISW(23) IN CARD GROUP 2 IS GREATER THAN 0 THEN THIS          ISC05960
C            PARAMETER IS IGNORED.  IF ISW(23) = 0, QFLG MAY BE USED IN         ISC05970
C            AN ANALOGOUS MANNER TO ISW(23) EXCEPT ONLY THE SOURCE FOR          ISC05980
C            WHICH QFLG > 0 IS AFFECTED.  ALL VALID VALUES FOR ISW(23)          ISC05990
C            APPLY FOR THIS PARAMETER (QFLG).  THE SOURCE EMISSION              ISC06000
C            RATE SCALARS ARE ENTERED IN CARD 5 BELOW.                          ISC06010
C     Q - SOURCE EMISSION RATE.                                                 ISC06020
C         FOR CONCENTRATION AND TYPE 0 & 1 SOURCES,                             ISC06030
C         UNITS ARE IN MASS PER UNIT TIME, TYPE 2 SOURCE UNITS ARE IN           ISC06040
C         MASS PER UNIT TIME PER UNIT AREA.  FOR DEPOSITION AND TYPE            ISC06050
C         0 & 1 SOURCES, UNITS ARE IN MASS, TYPE 2 SOURCE UNITS ARE             ISC06060
C         IN MASS PER UNIT AREA.                                                ISC06070
C     XS - X LOCATION OF SOURCE IN METERS.                                      ISC06080
C     YS - Y LOCATION OF SOURCE IN METERS.                                      ISC06090
C     ZS - ELEVATION OF SOURCE AT SOURCE BASE IN METERS.                        ISC06100
C     HS - HEIGHT OF SOURCE ABOVE GROUND IN METERS.                             ISC06110
C     TS - FOR TYPE 0 SOURCES, STACK EXIT TEMPERATURE IN DEGREES KELVIN.        ISC06120
C          FOR TYPE 1 SOURCES, INITIAL VERTICAL DIMENSION IN METERS.            ISC06130
C     VS - FOR TYPE 0 SOURCES, STACK EXIT VELOCITY IN METERS PER SECOND.        ISC06140
C          FOR TYPE 1 SOURCES, INITIAL HORIZONTAL DIMENSION IN METERS.          ISC06150
C          FOR TYPE 2 SOURCES, WIDTH OF SOURCE IN METERS.                       ISC06160
C     NOTE:  THE FOLLOWING FOUR INPUT PARAMETERS ARE FOR STACK-TYPE             ISC06170
C            SOURCES ONLY.                                                      ISC06180
C     D - STACK INNER DIAMETER IN METERS.                                       ISC06190
C     HB - HEIGHT OF BUILDING ADJACENT TO STACK IN METERS.                      ISC06200
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C     HL - LENGTH OF BUILDING ADJACENT TO STACK IN METERS.                ISC06210
C     HW - WIDTH OF BUILDING ADJACENT TO STACK IN METERS.                 ISC06220
C                                                                         ISC06230
C*CARDS 2-4  FORMAT(8F10.0)  THESE CARDS ARE READ ONLY IF THE PARAMETER   ISC06240
C                            NVS IN CARD 1 ABOVE IS > 0 FOR A GIVEN       ISC06250
C                            SOURCE.  IF SO, THESE CARDS ARE READ         ISC06260
C                            IMMEDIATELY FOLLOWING THE SOURCE CARD        ISC06270
C                            (CARD 1) ON WHICH THE PARAMETER NVS > 0.     ISC06280
C                                                                         ISC06290
C     PHI - ARRAY CONTAINING THE MASS FRACTION OF PARTICULATES FOR ALL    ISC06300
C           SETTLING CATEGORIES.  MAXIMUM OF 20 VALUES.                   ISC06310
C     VSN - ARRAY CONTAINING THE GRAVITATIONAL SETTLING VELOCITY FOR      ISC06320
C           PARTICULATES FOR ALL SETTLING CATEGORIES.  MAXIMUM OF 20      ISC06330
C           VALUES.                                                       ISC06340
C     GAMMA - ARRAY CONTAINING THE SURFACE REFLECTION COEFFICIENT FOR     ISC06350
C             PARTICULATES FOR ALL SETTLING CATEGORIES.  MAXIMUM OF       ISC06360
C             20 VALUES.                                                  ISC06370
C                                                                         ISC06380
C*CARD 5  FORMAT(8F10.0)  THIS CARD IS READ ONCE ONLY IF ISW(23) IN DATA  ISC06390
C                         CARD GROUP 2 > 0.  IF ISW(23) = 0, THIS CARD    ISC06400
C                         IS REPEATED FOR EACH SOURCE WHERE QFLG > 0 AS   ISC06410
C                         INDICATED IN CARD 1 ABOVE.  IF ISW(23) = 0 ANDISC06420
C                         QFLG = 0 FOR ALL SOURCES, THIS CARD IS NOT      ISC06430
C                         READ.                                           ISC06440
C                                                                         ISC06450
C     QTK - ENTER SOURCE EMISSION RATE SCALARS IN A FORMAT DEPENDING      ISC06460
C           ON THE VALUE OF ISW(23) (OR QFLG).  THE FORMAT IS THOROUGHLY  ISC06470
C           DISCUSSED IN THE DESCRIPTION OF PARAMETER ISW(23) IN CARD     ISC06480
C           GROUP 2.  THE FOLLOWING IS A SUMMARY OF THE AFOREMENTIONED    ISC06490
C           FORMAT.  IF ISW(23) (OR QFLG) = 1, ENTER 4 SEASONAL SCALARS   ISC06500
C           ON ONE CARD; = 2, ENTER 12 MONTHLY SCALARS.  TWO CARDS ARE    ISC06510
C           READ; =3, ENTER 24 HOURLY SCALARS.  THREE CARDS ARE READ;     ISC06520
C           = 4, ENTER 6 SCALARS FOR EACH WIND SPEED CATEGORY PER CARD    ISC06530
C           FOR EACH OF THE SIX STABILITY CATEGORIES.  SIX CARDS ARE      ISC06540
C           READ FOR A TOTAL OF 36 SCALARS; = 5, ENTER FOUR SETS OF 24    ISC06550
C           HOURLY SCALARS.  EACH SET REPRESENTS ONE SEASON OF SCALARS.   ISC06560
C           A TOTAL OF 12 CARDS ARE READ FOR A TOTAL OF 96 VALUES.        ISC06570
C                                                                         ISC06580
C*****CARD GROUP 7  FORMAT(I8,5F8.0,I8,2F8.0)                             ISC06590
C                   THIS CARD GROUP IS READ ONLY IF CARD METEOROLOGICAL   ISC06600
C                   DATA ARE ENTERED (ISW(19)=2).  THIS CARD GROUP        ISC06610
C                   CONSISTS OF 'NHOURS' CARDS.  THIS CARD GROUP IS       ISC06620
C                   REPEATED 'NDAYS' TIMES.                               ISC06630
C                                                                         ISC06640
C     JDAY - JULIAN DAY OF METEOROLOGICAL DATA.  THIS IS USED TO          ISC06650
C            COMPUTE SEASON OR MONTH FOR ANY SOURCES WHICH HAVE           ISC06660
C            VARIATIONAL EMISSION RATES.  THE PROGRAM USES THE JDAY       ISC06670
C            VALUE READ FOR THE FIRST HOUR OF EACH DAY.  THE SECOND       ISC06680
C            AND SUCCESSIVE HOURS FOR EACH DAY ARE IGNORED.  DEFAULT      ISC06690
C            VALUE = 1.                                                   ISC06700
C     AFV - WIND FLOW VECTOR. DIRECTION IN DEGREES TO WHICH THE WIND      ISC06710
C           IS FLOWING.                                                   ISC06720
C     AWS - WIND SPEED IN METERS PER SECOND AT REFERENCE HEIGHT 'ZR'.     ISC06730
C     HLH - HEIGHT OF SURFACE MIXING LAYER IN METERS.                     ISC06740
C     TEMP - AMBIENT AIR TEMPERATURE IN DEGREES KELVIN.                   ISC06750
C     DTHDZ - VERTICAL POTENTIAL TEMPERATURE GRADIENT IN DEGREES KELVIN   ISC06760
C             PER METER.                                                  ISC06770
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C            THIS VALUE IS READ ONLY IF ISW(22) EQUALS 3.                    ISC06780
C            THE VALUE OF DTHDZ IS NOT USED IF THE REG. DEFAULT              ISC06790
C            OPTION, ISW(28), IS CHOSEN. DEFAULTS ARE USED.                  ISC06800
C     IST - PASQUILL STABILITY CATEGORY.  A=1, B=2, C=3, ETC.                ISC06810
C     P - WIND PROFILE EXPONENT.                                             ISC06820
C         THIS VALUE IS READ ONLY IF ISW(21) EQUALS 3.                       ISC06830
C         THE VALUE OF P IS NOT USED IF THE REG. DEFAULT                     ISC06840
C         OPTION, ISW(28), IS CHOSEN. DEFAULTS ARE USED.                     ISC06850
C     DECAY - DECAY COEFFICIENT.  THE VALUE OF THIS PARAMETER OVERRIDES      ISC06860
C            THE PARAMETER DECAY IN CARD GROUP 5.                            ISC06870
C            NOTE THAT IF THE REG. DEFAULT OPTION IS CHOSEN                  ISC06880
C            AND SO2 IS MODELLED IN AN URBAN MODE THE DECAY                  ISC06890
C     TERM IS SET = TO .0000481 SECONDS**-1.                                 ISC06900
C     WHERE .0000481=.693/(3600*4)     4 HR SO2 HALF LIFE.                   ISC06910
C                                                                            ISC06920
C*************************************************************************ISC06930
C                                                                            ISC06940
C     THIS IS THE MAIN PROGRAM OF THE EPA INDUSTRIAL SOURCE COMPLEX          ISC06950
C     SHORT TERM MODEL.  THIS ROUTINE'S PURPOSE IS TO CALCULATE THE          ISC06960
C     AMOUNT OF STORAGE REQUIRED FOR TABLES, RECEPTOR GRID AND SOURCE        ISC06970
C     INFORMATION.  IN ORDER FOR THESE CALCULATIONS TO BE MADE THE 'ISW'     ISC06980
C     ARRAY, THE VARIABLES WHICH DETERMINE THE NUMBER OF RECEPTORS AND       ISC06990
C     THE NUMBER OF SOURCES ARE READ.                                        ISC07000
C                                                                            ISC07010
      INTEGER TITLE                                                          ISC07020
      COMMON QF(43500)                                                       ISC07030
      DIMENSION IZERO(161),IQF(1)                                            ISC07040
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,             ISC07050
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE,      ISC07060
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,I13                 ISC07070
      EQUIVALENCE (ISW,IZERO),(QF,IQF)                                       ISC07080
C     SET MAXIMUM LIMIT FOR 'QF' ARRAY.  MUST AGREE WITH VALUE USED TO       ISC07090
C     DIMENSION 'QF'.                                                        ISC07100
      LIMIT = 43500                                                          ISC07110
C     CLEAR 'QF' ARRAY AND 'LOGIX' BLOCK.                                    ISC07120
      DO 10  I = 1,LIMIT                                                     ISC07130
   10 QF(I) = 0.0                                                            ISC07140
      DO 20  I = 1,161                                                       ISC07150
   20 IZERO(I) = 0                                                           ISC07160
C     SET INPUT AND OUTPUT LOGICAL UNIT NUMBERS.                             ISC07170
      IN = 5                                                                 ISC07180
      IO = 6                                                                 ISC07190
      WRITE (6,1234)                                                         ISC07200
 1234 FORMAT ('1',21X,'ISCSTU (VERSION 86170) '/                             ISC07210
     1 22X,'AN AIR QUALITY DISPERSION MODEL IN'/                             ISC07220
     2 22X,'SECTION 2.  NON-GUIDELINE MODELS.'/                              ISC07230
     3 22X,'IN UNAMAP (VERSION 5)  JUNE  86.'/                               ISC07240
     4 22X,'SOURCE: UNAMAP FILE ON EPA''S UNIVAC 1110, RTP, NC.')            ISC07250
C     INPUT TITLE.                                                           ISC07260
      READ(IN,9001) (TITLE(I),I=1,15)                                        ISC07270
C     INPUT LOGIC OPTIONS.                                                   ISC07280
      READ(IN,9002) (ISW(I),I=1,41)                                          ISC07290
      IF(ISW(30).EQ.1) THEN                                                  ISC07300
      WRITE(IO,9502) (ISW(I),I=1,40)                                         ISC07310
      ENDIF                                                                  ISC07320
                                                                             ISC07330
                                                                             ISC07340
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C     CHANGE PARAMETERS IF REGULATORY DEFAULT OPTION DESIRED                    ISC07350
      IF(ISW(28).NE.1) GO TO 27                                                 ISC07360
      ISW(19)=1                                                                 ISC07370
C     PRE-PROCESSED METEOROLOGICAL TAPE/FILE ASSUMED.                           ISC07380
      ISW(21)=1                                                                 ISC07390
C     DEFAULT WIND PROFILE EXPONENTS (RURAL AND URBAN)                          ISC07400
      ISW(22)=1                                                                 ISC07410
C     DEFAULT VERTICAL POTENTIAL TEMPERATURE GRADIENTS.                         ISC07420
      ISW(24)=1                                                                 ISC07430
C     FINAL PLUME RISE                                                          ISC07440
      ISW(25)=2                                                                 ISC07450
C     STACK TIP DOWNWASH INCORPORATED                                           ISC07460
      ISW(26)=1                                                                 ISC07470
C     BUOYANCY INDUCED DISPERSION INCORPORATED                                  ISC07480
      ISW(27)=1                                                                 ISC07490
C     CALM WIND PROCESSING                                                      ISC07500
   27 CONTINUE                                                                  ISC07510
C     RESET ISW(27), CALMS OPTION IF CARD MET                                   ISC07520
      IF(ISW(19).EQ.2) ISW(27)=2                                                ISC07530
C     INPUT SOURCE & RECEPTOR SIZE VALUES.                                      ISC07540
      READ(IN,9003) NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,IPERD,NHOURS,           ISC07550
     1 NDAYS                                                                    ISC07560
      IF(ISW(30).EQ.1) THEN                                                     ISC07570
      WRITE(IO,9503) NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,IPERD,NHOURS,           ISC07580
     1 NDAYS                                                                    ISC07590
      ENDIF                                                                     ISC07600
C     DETERMINE NUMBER OF TIME PERIODS TO BE CALCULATED.                        ISC07610
      NAVG = 0                                                                  ISC07620
      DO 30  I = 7,14                                                           ISC07630
      IF (ISW(I) .LE. 0) GOTO 30                                                ISC07640
      NAVG = NAVG + 1                                                           ISC07650
   30 CONTINUE                                                                  ISC07660
      IF(NAVG.NE.0) GO TO 35                                                    ISC07670
      IF(ISW(15).EQ.0) GO TO 80                                                 ISC07680
      ISW(16)=0                                                                 ISC07690
      ISW(17)=0                                                                 ISC07700
      ISW(18)=0                                                                 ISC07710
C     CALCULATE TOTAL NUMBER OF RECEPTORS.                                      ISC07720
   35 NPNTS = NXPNTS*NYPNTS + NXWYPT                                            ISC07730
      NGROPS = NGROUP                                                           ISC07740
      IF(NGROUP .LE. 0) NGROPS = 1                                              ISC07750
      NN = NAVG*NPNTS*NGROPS                                                    ISC07760
C     CALCULATE INDICES FOR STORAGE ALLOCATION.                                 ISC07770
      I1 = NPNTS + NPNTS + 1                                                    ISC07780
      I2 = I1 + NN                                                              ISC07790
      I3 = I2                                                                   ISC07800
      IF(ISW(15) .EQ. 1) I3 = I2 + NPNTS*NGROPS                                 ISC07810
      I4 = I3                                                                   ISC07820
      I5 = I3                                                                   ISC07830
      IF(NXPNTS .EQ. 0 .OR. NYPNTS .EQ. 0) GOTO 40                              ISC07840
      I4 = I3 + NXPNTS                                                          ISC07850
      I5 = I4 + NYPNTS                                                          ISC07860
   40 I6 = I5                                                                   ISC07870
      I7 = I5                                                                   ISC07880
      IF(NXWYPT .EQ. 0) GOTO 50                                                 ISC07890
      I6 = I5 + NXWYPT                                                          ISC07900
      I7 = I6 + NXWYPT                                                          ISC07910
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   50 I8 = I7                                                            ISC07920
      IF(ISW(4) .NE. 0) I8 = I7 + NPNTS                                  ISC07930
      I9 = I8                                                            ISC07940
      I10 = 4                                                            ISC07950
      IF(ISW(17).GT.1) I10=6                                             ISC07960
      IF(ISW(17) .NE. 0) I9 = I8 + I10*NN                                ISC07970
      I10 = I9                                                           ISC07980
      I11 = I10                                                          ISC07990
      I12 = I10                                                          ISC08000
      IF(ISW(18) .LE. 0) GOTO 60                                         ISC08010
      I10 = I9 + 150*NAVG*NGROPS                                         ISC08020
      I11 = I10 + 50*NAVG*NGROPS                                         ISC08030
      I12 = I11 + NAVG*NGROPS                                            ISC08040
   60 I13 = I12 + 215*NSOURC - 1                                         ISC08050
C     DETERMINE IF CALCULATED STORAGE ALLOCATION EXCEEDS LIMIT.          ISC08060
      IF(I13 .LE. LIMIT) GOTO 70                                         ISC08070
      WRITE(IO,9004) I13,LIMIT                                           ISC08080
      GO TO 90                                                           ISC08090
C     CALL INPUT ROUTINE.                                                ISC08100
   70 CALL INCHK(QF(I3),QF(I4),QF(I5),QF(I6),QF(I7),QF(I12))             ISC08110
C                                                                        ISC08120
C     CALL MODEL ROUTINE.                                                ISC08130
      CALL MODEL(QF(1),QF(I1),QF(I2),QF(I3),QF(I4),QF(I5),QF(I6),QF(I7),ISC08140
     1 QF(I8),QF(I9),IQF(I10),IQF(I11),QF(I12))                          ISC08150
      GO TO 90                                                           ISC08160
   80 WRITE (IO,9005)                                                    ISC08170
   90 CONTINUE                                                           ISC08180
      STOP                                                               ISC08190
 9001 FORMAT(15A4)                                                       ISC08200
 9002 FORMAT(40I2)                                                       ISC08210
 9003 FORMAT(13I6)                                                       ISC08220
 9004 FORMAT(59H1   ***ERROR***  CALCULATED STORAGE ALLOCATION LIMIT EQUISC08230
     1ALS,I6,/52H AND EXCEEDS THE MAXIMUM STORAGE ALLOCATION LIMIT OF,I6ISC08240
     2,/16H RUN TERMINATED.)                                             ISC08250
 9005 FORMAT (84H1 ***ERROR*** ISW(7) THROUGH ISW(15) ARE ZERO, SPECIFY ISC08260
     1ONE OR MORE OF THESE OPTIONS.)                                     ISC08270
 9501 FORMAT(1X,15A4)                                                    ISC08280
 9502 FORMAT(1X,40I2)                                                    ISC08290
 9503 FORMAT(1X,13I6)                                                    ISC08300
      END                                                                ISC08310
C                                                                        ISC08320
      SUBROUTINE INCHK(GRIDX,GRIDY,XDIS,YDIS,GRIDZ,SOURCE)               ISC08330
C               SUBROUTINE INCHK (VERSION 86170), PART OF ISCST.       ISC08340
C                                                                        ISC08350
C     THIS ROUTINE READS THE REST OF THE INPUT VARIABLES AND PROVIDES    ISC08360
C     DEFAULT VALUES IF REQUIRED.  ALSO TABLES LISTING THE INPUT VARI-   ISC08370
C     ABLES ARE CONTROLLED BY THIS ROUTINE.                              ISC08380
C                                                                        ISC08390
      LOGICAL DONE                                                       ISC08400
      INTEGER TITLE,WAKE,QFLG,QFLGS                                      ISC08410
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,         ISC08420
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE,  ISC08430
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT           ISC08440
      COMMON /MET/ IDAY(366),ISTAB(24),AWS(24),TEMP(24),AFV(24),         ISC08450
     1 AFVR(24),HLH(24,2),P(24),DTHDZ(24),DECAY(24),PDEF(6,6),           ISC08460
     2 DTHDEF(6,6),ZR,DDECAY,IMET,ITAP,TK,UCATS(5)                       ISC08470
      DIMENSION GRIDX(1),GRIDY(1),XDIS(1),YDIS(1),GRIDZ(1),SOURCE(215,1)ISC08480
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      DIMENSION METER(2),SEASON(2,4),ATHRUF(6),UCTDEF(5)                ISC08490
C     POEFU AND POEFR ARE URBAN AND RURAL DEFAULT WIND                  ISC08500
C     PROFILE EXPONENTS                                                 ISC08510
      DIMENSION POEFR(6),POEFU(6)                                       ISC08520
      EQUIVALENCE (ISW(23),QFLGS)                                       ISC08530
      DATA ATHRUF / 1HA,1HB,1HC,1HD,1HE,1HF /                           ISC08540
      DATA POEFU/.15,.15,.20,.25,.30,.30/                               ISC08550
      DATA POEFR/.07,.07,.10,.15,.35,.55/                               ISC08560
      DATA UCTDEF / 1.54,3.09,5.14,8.23,10.8 /                          ISC08570
      DATA METER /4H(MET,4HERS)/                                        ISC08580
      DATA SEASON /4HWINT,4HER  ,4HSPRI,4HNG  ,4HSUMM,4HER  ,4HAUTU,    ISC08590
     1 4HMN   /                                                         ISC08600
      DATA IBLANK /4H    /                                              ISC08610
C     CHECK 'ISW' AND SET DEFAULT VALUES.                               ISC08620
C     DEFAULT TO CONCENTRATION ON RECTANGULAR GRID & DISCRETE POINTS.   ISC08630
   10 IF(ISW(1) .LE. 0) ISW(1) = 1                                      ISC08640
      IF(ISW(2) .LE. 0) ISW(2) = 1                                      ISC08650
      IF(ISW(3) .LE. 0) ISW(3) = 1                                      ISC08660
C     DEFAULT CARD MET PARAMETERS.                                      ISC08670
      IF(NDAYS .LE. 0) NDAYS = 1                                        ISC08680
C     DEFAULT TO PRE-PROCESSED MET DATA WITH RURAL OPTION.              ISC08690
      IF(ISW(19).LE.0) ISW(19)=1                                        ISC08700
      IF(ISW(19) .EQ. 2 .AND. ISW(20) .NE. 3) ISW(20) = 0               ISC08710
C     DEFAULT TO PROGRAM'S WIND PROFILE EXPONENT AND VERTICAL POTENTIAL  ISC08720
C     TEMPERATURE GRADIENT VALUES.                                      ISC08730
      IF(ISW(21) .LT. 1) ISW(21) = 1                                    ISC08740
      IF(ISW(22) .LT. 1) ISW(22) = 1                                    ISC08750
C     DEFAULT TO FINAL PLUME RISE FOR ALL RECEPTORS.                    ISC08760
      IF(ISW(24) .LT. 1) ISW(24) = 1                                    ISC08770
C     DEFAULT TO NO STACK DOWNWASH ADJUSTMENT.                          ISC08780
      IF(ISW(25) .LT. 1) ISW(25) = 1                                    ISC08790
C     READ GRID THEN DISCRETE POINTS                                    ISC08800
C     READ NON-DISCRETE RECEPTOR DATA                                   ISC08810
      IF(NXPNTS .EQ. 0 .OR. NYPNTS .EQ. 0) GOTO 70                      ISC08820
      IF(ISW(2) .NE. 3) READ(IN,9020) (GRIDX(I),I=1,NXPNTS)             ISC08830
      IF(ISW(2).NE.3.AND.ISW(30).EQ.1) THEN                             ISC08840
      WRITE(IO,9520) (GRIDX(I),I=1,NXPNTS)                              ISC08850
      ENDIF                                                             ISC08860
      IF(ISW(2) .LT. 3) READ(IN,9020) (GRIDY(I),I=1,NYPNTS)             ISC08870
      IF(ISW(2).LT.3.AND.ISW(30).EQ.1) THEN                             ISC08880
      WRITE(IO,9520) (GRIDY(I),I=1,NYPNTS)                              ISC08890
      ENDIF                                                             ISC08900
      IF(ISW(2) .NE. 3) GOTO 30                                         ISC08910
      READ(IN,9020) GRIDX(1),DX                                         ISC08920
      IF(ISW(30).EQ.1) THEN                                             ISC08930
      WRITE(IO,9520) GRIDX(1),DX                                        ISC08940
      ENDIF                                                             ISC08950
      I2 = NXPNTS - 1                                                   ISC08960
      DO 20  I = 1,I2                                                   ISC08970
      I1 = I + 1                                                        ISC08980
   20 GRIDX(I1) = GRIDX(I) + DX                                         ISC08990
   30 IF(ISW(2) .LT. 3) GOTO 50                                         ISC09000
      READ(IN,9020) GRIDY(1),DY                                         ISC09010
      IF(ISW(30).EQ.1) THEN                                             ISC09020
      WRITE(IO,9520) GRIDY(1),DY                                        ISC09030
      ENDIF                                                             ISC09040
      I2 = NYPNTS - 1                                                   ISC09050
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      DO 40  I = 1,I2                                                    ISC09060
      I1 = I + 1                                                         ISC09070
   40 GRIDY(I1) = GRIDY(I) + DY                                          ISC09080
   50 IF(ISW(2) .NE. 2 .AND. ISW(2) .NE. 4) GOTO 61                      ISC09090
C     SET DEFAULT DIRECTION VALUES.                                      ISC09100
      DO 60 I = 1,NYPNTS                                                 ISC09110
   60 IF(GRIDY(I) .LE. 0.0 .OR. GRIDY(I) .GT. 360.0) GRIDY(I) = 360.0    ISC09120
 61   IF(ISW(4).EQ.0) GO TO 70                                           ISC09130
C     READ NON-DISCRETE RECEPTOR ELEVATIONS                              ISC09140
      DO 65 J=1,NYPNTS                                                   ISC09150
      I1 = (J-1)*NXPNTS                                                  ISC09160
      I2 = I1 + NXPNTS                                                   ISC09170
      I1 = I1 + 1                                                        ISC09180
      READ(IN,9020) (GRIDZ(I),I=I1,I2)                                   ISC09190
      IF(ISW(30).EQ.1) THEN                                              ISC09200
      WRITE(IO,9520) (GRIDZ(I),I=I1,I2)                                  ISC09210
      ENDIF                                                              ISC09220
 65   CONTINUE                                                           ISC09230
   70 IF(NXWYPT .EQ. 0) GOTO 90                                          ISC09240
C     READ ALL DISCRETE RECEPTOR DATA                                    ISC09250
C     IF USER DOES NOT WANT TO CONSIDER RECEPTOR TERRAIN , DO NOT        ISC09260
C     INPUT THE 3RD VARIABLE IN THE FOLLOWING RECORDS.                   ISC09270
      DO 75 I=1,NXWYPT                                                   ISC09280
      I1=I+NXPNTS*NYPNTS                                                 ISC09290
      READ(IN,9020) XDIS(I),YDIS(I),GRIDZ(I1)                            ISC09300
      IF(ISW(30).EQ.1) THEN                                              ISC09310
      WRITE(IO,9520) XDIS(I),YDIS(I),GRIDZ(I1)                           ISC09320
      ENDIF                                                              ISC09330
 75   CONTINUE                                                           ISC09340
      IF(ISW(3) .NE. 2) GOTO 90                                          ISC09350
C     SET DEFAULT DIRECTION VALUES.                                      ISC09360
      DO 80 I = 1,NXWYPT                                                 ISC09370
   80 IF(YDIS(I) .LE. 0.0 .OR. YDIS(I) .GT. 360.0) YDIS(I) = 360.0       ISC09380
 90   IF(ISW(4).LT.0) GO TO 125                                          ISC09390
C     READ DISCRETE RECEPTOR ELEVATIONS.                                 ISC09400
C     CHANGE RECEPTOR ELEVATION UNITS(FT TO M)                           ISC09410
      DO 121 I=1,NPNTS                                                   ISC09420
  121 GRIDZ(I) = GRIDZ(I) * .3048006                                     ISC09430
  125 ISW(4) =IABS(ISW(4))                                               ISC09440
C     READ SOURCE GROUP INFO                                             ISC09450
      IF(NGROUP .EQ. 0) GOTO 140                                         ISC09460
      READ(IN,9023) (NSOGRP(I),I=1,NGROUP)                               ISC09470
      IF(ISW(30).EQ.1) THEN                                              ISC09480
      WRITE(IO,9523) (NSOGRP(I),I=1,NGROUP)                              ISC09490
      ENDIF                                                              ISC09500
      I1 = 0                                                             ISC09510
      DO 130 I = 1,NGROUP                                                ISC09520
  130 I1 = I1 + NSOGRP(I)                                                ISC09530
      READ(IN,9024) (IDSOR(I),I=1,I1)                                    ISC09540
      IF(ISW(30).EQ.1) THEN                                              ISC09550
      WRITE(IO,9524) (IDSOR(I),I=1,I1)                                   ISC09560
      ENDIF                                                              ISC09570
C     DEFAULT OR READ WIND PROFILE EXPONENTS, VERTICAL POTENTIAL         ISC09580
C     TEMPERATURE GRADIENTS.                                             ISC09590
 140  IF(ISW(21).EQ.2) THEN                                              ISC09600
C     CARD WIND PROFILE EXPONENTS ONLY READ IF THE                       ISC09610
C     REGULATORY DEFAULT OPTION IS NOT CHOSEN.                           ISC09620
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      DO 150  J = 1,6                                                   ISC09630
      READ(IN,9020)  (PDEF(I,J),I=1,6)                                  ISC09640
      IF(ISW(30).EQ.1) THEN                                             ISC09650
      WRITE(IO,9520) (PDEF(I,J),I=1,6)                                  ISC09660
      ENDIF                                                             ISC09670
  150 CONTINUE                                                          ISC09680
      ELSE                                                              ISC09690
      IF(ISW(20).EQ.0) THEN                                             ISC09700
C     RURAL WIND PROFILE EXPONENTS                                      ISC09710
      DO 154 J=1,6                                                      ISC09720
      DO 154 I=1,6                                                      ISC09730
  154 PDEF(I,J)=PDEFR(J)                                                ISC09740
      ELSE                                                              ISC09750
C     URBAN WIND PROFILE EXPONENTS                                      ISC09760
      DO 156 J=1,6                                                      ISC09770
      DO 156 I=1,6                                                      ISC09780
  156 PDEF(I,J)=PDEFU(J)                                                ISC09790
      ENDIF                                                             ISC09800
      ENDIF                                                             ISC09810
  160 IF(ISW(22) .NE. 2) GOTO 180                                       ISC09820
C     CARD DTHDEF ONLY IF REG. DEFAULT OPTION NOT CHOSEN                ISC09830
      DO 170  J = 1,6                                                   ISC09840
      READ(IN,9020)  (DTHDEF(I,J),I=1,6)                                ISC09850
      IF(ISW(30).EQ.1) THEN                                             ISC09860
      WRITE(IO,9520) (DTHDEF(I,J),I=1,6)                                ISC09870
      ENDIF                                                             ISC09880
  170 CONTINUE                                                          ISC09890
C     ENTER QFLGS AND WIND SPEED CATEGORIES.                            ISC09900
  180 READ(IN,9020) ZR,(UCATS(I),I=1,5)                                 ISC09910
      IF(ISW(30).EQ.1) THEN                                             ISC09920
      WRITE(IO,9520) ZR,(UCATS(I),I=1,5)                                ISC09930
      ENDIF                                                             ISC09940
      DO 190   I = 1,5                                                  ISC09950
      IF(UCATS(I) .GT. 0.0) GOTO 190                                    ISC09960
      UCATS(I) = UCTDEF(I)                                              ISC09970
  190 CONTINUE                                                          ISC09980
C     READ GENERAL INPUT VARIABLES & SET DEFAULT VALUES.                ISC09990
  200 READ(IN,9021) TK,DDECAY,(IQUN(I),I=1,3),                          ISC10000
     1 (ICHIUN(I),I=1,7),IMET,ITAP                                      ISC10010
      IF(ISW(30).EQ.1) THEN                                             ISC10020
      WRITE(IO,9521) TK,DDECAY,(IQUN(I),I=1,3),                         ISC10030
     X  (ICHIUN(I),I=1,7),IMET,ITAP                                     ISC10040
      ENDIF                                                             ISC10050
C     SET HALF LIFE DEFAULT VALUE OF 4 HOURS (DECAY=                    ISC10060
C     .0000481) IF SO2 IS MODELLED IN AN URBAN MODE WITH                ISC10070
C     THE REGULATORY DEFAULT OPTION.                                    ISC10080
      IF(ISW(28).EQ.1.AND.ISW(29).EQ.1.AND.ISW(20).GT.0)                ISC10090
     X  DDECAY=.0000481                                                 ISC10100
      IF(TK .LE. 0.0 .AND. ISW(1) .EQ. 1) TK = 1.E6                     ISC10110
      IF(TK .LE. 0.0 .AND. ISW(1) .EQ. 2) TK = 1.0                      ISC10120
      IF(IMET .LE. 0 .AND. ISW(19) .EQ. 1) IMET = 9                     ISC10130
      IF(IMET .LE. 0 .AND. ISW(19) .EQ. 2) IMET = IN                    ISC10140
      IF(ITAP .LE. 0) ITAP = 3                                          ISC10150
      IF(ZR .LE. 0.0) ZR = 10.0                                         ISC10160
      DO 210 I = 1,3                                                    ISC10170
      IF(IQUN(I) .NE. IBLANK) GOTO 230                                  ISC10180
  210 CONTINUE                                                          ISC10190
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      IF(ISW(1) .EQ. 2) GOTO 220                                          ISC10200
      IQUN(1) = 4H(GRA                                                    ISC10210
      IQUN(2) = 4HMS/S                                                    ISC10220
      IQUN(3) = 4HEC)                                                     ISC10230
      GOTO 230                                                            ISC10240
  220 IQUN(1) = 4H  (G                                                    ISC10250
      IQUN(2) = 4HRAMS                                                    ISC10260
      IQUN(3) = 4H)                                                       ISC10270
  230 DO 240 I = 1,7                                                      ISC10280
      IF(ICHIUN(I) .NE. IBLANK) GOTO 260                                  ISC10290
  240 CONTINUE                                                            ISC10300
      IF(ISW(1) .EQ. 2) GOTO 250                                          ISC10310
      ICHIUN(1) = 4H(MIC                                                  ISC10320
      ICHIUN(2) = 4HROGR                                                  ISC10330
      ICHIUN(3) = 4HAMS/                                                  ISC10340
      ICHIUN(4) = 4HCUBI                                                  ISC10350
      ICHIUN(5) = 4HC ME                                                  ISC10360
      ICHIUN(6) = 4HTER)                                                  ISC10370
      ICHIUN(7) = 4H                                                      ISC10380
      GOTO 260                                                            ISC10390
  250 ICHIUN(1) = 4H(GRA                                                  ISC10400
      ICHIUN(2) = 4HMS/S                                                  ISC10410
      ICHIUN(3) = 4HQUAR                                                  ISC10420
      ICHIUN(4) = 4HE ME                                                  ISC10430
      ICHIUN(5) = 4HTER                                                   ISC10440
      ICHIUN(6) = 4H                                                      ISC10450
      ICHIUN(7) = 4H                                                      ISC10460
C     READ 'DAY' ARRAY & MET IDENTIFICATION.                              ISC10470
  260 IF(ISW(19) .NE. 1) GOTO 270                                         ISC10480
      READ(IN,9022) (IDAY(I),I=1,366)                                     ISC10490
      IF(ISW(30).EQ.1) THEN                                               ISC10500
      WRITE(IO,9522) (IDAY(I),I=1,366)                                    ISC10510
      ENDIF                                                               ISC10520
      READ(IN,9024) ISS,ISY,IUS,IUY                                       ISC10530
      IF(ISW(30).EQ.1) THEN                                               ISC10540
      WRITE(IO,9524) ISS,ISY,IUS,IUY                                      ISC10550
      ENDIF                                                               ISC10560
      NDAYS = 365                                                         ISC10570
      IF(MOD(ISY,4) .EQ. 0) NDAYS = 366                                   ISC10580
      READ(IMET) ISSI,ISYI,IUSI,IUYI                                      ISC10590
      IF(ISS.EQ.ISSI.AND.ISY.EQ.ISYI.AND.IUS.EQ.IUSI.AND.IUY.EQ.IUYI)     ISC10600
     1 GOTO 280                                                           ISC10610
      WRITE(IO,9025) ISS,ISSI,ISY,ISYI,IUS,IUSI,IUY,IUYI                  ISC10620
      STOP                                                                ISC10630
C     FOR CARD MET DATA SET RURAL-URBAN SWITCH TO RURAL                   ISC10640
C     EXCEPT IF URBAN MODE 3 IS USED                                      ISC10650
  270   IF (ISW(20) .NE. 3) ISW(20)=0                                     ISC10660
  280 IF(NSOURC .GT. 0) GOTO 290                                          ISC10670
      WRITE(IO,9026)                                                      ISC10680
      STOP                                                                ISC10690
C*                                                                        ISC10700
C     READ SOURCE DATA.                                                   ISC10710
C     MOST VARIABLES ARE READ DIRECTLY INTO THE 'SOURCE' ARRAY WHICH      ISC10720
C     HAS 215 STORAGE LOCATIONS ALLOCATED PER SOURCE.  STORAGE LOCATION   ISC10730
C     1 CONTAINS WAKE, QLFG, NVS & ITYPE PACKED INTO THE FIRST LOCATION.  ISC10740
C     STORAGE LOCATIONS 2-13 CONTAIN:  NSO, Q, X, Y, ZS, HS, TS OR        ISC10750
C     SIGZO, VS OR SIGYO OR XO, D, HB, BUILDING LENGTH, AND BUILDING      ISC10760
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C     WIDTH, RESPECTIVELY.  STORAGE LOCATIONS 16-35 CONTAIN PHI, 36-55  ISC10770
C     CONTAIN SETTLING VELOCITIES AND 56-75 CONTAIN GAMMA.  STORAGE     ISC10780
C     LOCATIONS 76-81 CONTAIN STABILITY-DEPENDENT LATERAL VIRTUAL       ISC10790
C     DISTANCES AND LOCATIONS 82-117 CONTAIN STABILITY AND XBAR-        ISC10800
C     DEPENDENT VERTICAL VIRTUAL DISTANCES BOTH OF WHICH ARE COMPUTED   ISC10810
C     IN SUBROUTINE MODEL.  STORAGE LOCATIONS 120-215 CONTAIN Q         ISC10820
C     ADJUSTMENT FACTORS AS A FUNCTION OF EITHER TIME OF DAY-SEASONAL ORISC10830
C     STABILITY-WIND SPEED VARIATIONS.  STORAGE LOCATIONS 14, 15,       ISC10840
C         ARE CURRENTLY NOT BEING USED.                                 ISC10850
C     8/85  STORAGE LOCATIONS 118 AND 119 ARE NOW BEING USED TO         ISC10860
C     ALLOW FOR CALCULATIONS WHEN SOURCE-RECEPTOR DISTANCES             ISC10870
C     ARE LESS THAN 100M.                                               ISC10880
C                                                                       ISC10890
  290 II = 1                                                            ISC10900
  300 IF(II .GT. NSOURC) GOTO 320                                       ISC10910
      READ(IN,9027) NSO,ITYPE,WAKE,NVS,QFLG,(SOURCE(I,II),I=3,13)       ISC10920
      IF(NVS .LE. 0) GOTO 310                                           ISC10930
C     INPUT VARIABLES RELATED TO PARTICULATE SOURCES.                   ISC10940
      READ(IN,9020) (SOURCE(15+I,II),I=1,NVS)                           ISC10950
      READ(IN,9020) (SOURCE(35+I,II),I=1,NVS)                           ISC10960
      READ(IN,9020) (SOURCE(55+I,II),I=1,NVS)                           ISC10970
  310 CONTINUE                                                          ISC10980
C     PACK SOURCE VARIABLES WAKE, QFLG, NVS & ITYPE INTO FIRST LOCATION.ISC10990
C     ALSO STORE SOURCE NUMBER.                                         ISC11000
      SOURCE(1,II) = ITYPE + NVS*16 + QFLG*512 + WAKE*8192              ISC11010
      SOURCE(2,II) = NSO                                                ISC11020
      II = II + 1                                                       ISC11030
      GOTO 300                                                          ISC11040
C     ENTER SOURCE EMISSION RATE SCALARS.                               ISC11050
  320 II = 1                                                            ISC11060
      IF(QFLGS .LT. 1 .OR. QFLGS .GT. 5) GOTO 330                       ISC11070
      DONE = .TRUE.                                                     ISC11080
      QFLG = QFLGS                                                      ISC11090
      GOTO 350                                                          ISC11100
  330 DONE = .FALSE.                                                    ISC11110
  340 IF(II .GT. NSOURC) GOTO 430                                       ISC11120
      ITYPE = SOURCE(1,II)                                              ISC11130
      QFLG = ITYPE/512 - (ITYPE/8192)*16                                ISC11140
      IF(QFLG .LT. 1 .OR. QFLG .GT. 5) GOTO 420                         ISC11150
  350 J = 1                                                             ISC11160
      I = 4                                                             ISC11170
      GOTO (400,360,370,380,390), QFLG                                  ISC11180
  360 I = 12                                                            ISC11190
      GOTO 400                                                          ISC11200
  370 I = 24                                                            ISC11210
      GOTO 400                                                          ISC11220
  380 J = 6                                                             ISC11230
      I = 6                                                             ISC11240
      GOTO 400                                                          ISC11250
  390 J = 4                                                             ISC11260
      I = 24                                                            ISC11270
  400 DO 410 II = 1,J                                                   ISC11280
      IFR = (II-1)*I + 120                                              ISC11290
      ITO = IFR + I - 1                                                 ISC11300
      READ(IN,9020) (SOURCE(I2,II),I2=IFR,ITO)                          ISC11310
  410 CONTINUE                                                          ISC11320
      IF(DONE) GOTO 430                                                 ISC11330
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  420 II = II + 1                                                        ISC11340
      GOTO 340                                                           ISC11350
C     LIST ALL INPUT VARIABLES IF DESIRED.                               ISC11360
  430 IF(ISW(6) .LE. 0) GOTO 820                                         ISC11370
      WRITE(IO,9029) (TITLE(I),I=1,15)                                   ISC11380
      WRITE(IO,9030) (ISW(I),I=1,14)                                     ISC11390
      WRITE(IO,9031) (ISW(I),I=15,26)                                    ISC11400
      WRITE(IO,9061) (ISW(I),I=27,30)                                    ISC11410
      WRITE(IO,9032) NSOURC,NGROUP,IPERD,NXPNTS,NYPNTS,NXNYPT            ISC11420
      IF(ISW(19) .EQ. 2) WRITE(IO,9033) NHOURS,NDAYS                     ISC11430
      WRITE(IO,9034) TK,ZR,IMET                                          ISC11440
      IF(ISW(19) .NE. 1) GOTO 440                                        ISC11450
      WRITE(IO,9035) DDECAY,ISS,ISY,IUS,IUY                              ISC11460
  440 CONTINUE                                                           ISC11470
      IF(ISW(5) .GT. 0) WRITE(IO,9036) ITAP                              ISC11480
      WRITE(IO,9056) LIMIT,MIMIT                                         ISC11490
      WRITE(IO,9029) (TITLE(I),I=1,15)                                   ISC11500
      LINE = 6                                                           ISC11510
      IF(ISW(19) .NE. 1) GOTO 450                                        ISC11520
C     PRINT 'DAY' ARRAY.                                                 ISC11530
      LINE = 18                                                          ISC11540
      WRITE(IO,9037) (IDAY(I),I=1,366)                                   ISC11550
  450 IF(NGROUP .EQ. 0) GOTO 470                                         ISC11560
C     PRINT SOURCE GROUP INFO.                                           ISC11570
      LINE = LINE + 12                                                   ISC11580
      WRITE(IO,9057) (NSOGRP(I),I=1,NGROUP)                              ISC11590
      I3 = 0                                                             ISC11600
      DO 460 I = 1,NGROUP                                                ISC11610
  460 I3 = I3 + NSOGRP(I)                                                ISC11620
      WRITE(IO,9058) (IDSOR(I),I=1,I3)                                   ISC11630
C     PRINT UPPER BOUND OF FIRST 5 WIND SPEED CATEGORIES.                ISC11640
  470 LINE = LINE + 6                                                    ISC11650
      WRITE(IO,9001) (UCATS(I),I=1,5)                                    ISC11660
      IF(ISW(19).EQ.2.AND.ISW(6).EQ.2) GOTO 530                          ISC11670
      IF(ISW(21) .EQ. 3) GOTO 500                                        ISC11680
C     PRINT WIND PROFILE EXPONENTS.                                      ISC11690
      LINE = LINE + 12                                                   ISC11700
      IF(LINE .LT. 57) GOTO 480                                          ISC11710
      LINE = 15                                                          ISC11720
      WRITE(IO,9029) TITLE                                               ISC11730
  480 WRITE(IO,9059)                                                     ISC11740
      WRITE(IO,9016) (I1,I1=1,6)                                         ISC11750
      DO 490  I = 1,6                                                    ISC11760
  490 WRITE(IO,9017) ATHRUF(I),(PDEF(J,I),J=1,6)                         ISC11770
  500 IF(ISW(22) .EQ. 3) GOTO 530                                        ISC11780
C     PRINT VERTICAL POTENTIAL TEMPERATURE GRADIENTS.                    ISC11790
      LINE = LINE + 12                                                   ISC11800
      IF(LINE .LT. 57) GOTO 510                                          ISC11810
      LINE = 15                                                          ISC11820
      WRITE(IO,9029) TITLE                                               ISC11830
  510 WRITE(IO,9060)                                                     ISC11840
      WRITE(IO,9016) (I1,I1=1,6)                                         ISC11850
      DO 520  I = 1,6                                                    ISC11860
  520 WRITE(IO,9017) ATHRUF(I),(DTHDEF(J,I),J=1,6)                       ISC11870
C     PRINT RECEPTOR INFO.                                               ISC11880
  530 IF(NXPNTS .EQ. 0 .OR. NYPNTS .EQ. 0) GOTO 550                      ISC11890
      LINE = LINE + 20                                                   ISC11900
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      IF(LINE .LT. 57) GOTO 540                                          ISC11910
      LINE = 6                                                           ISC11920
      WRITE(IO,9029) TITLE                                               ISC11930
  540 IF(ISW(2) .EQ. 1 .OR. ISW(2) .EQ. 3) WRITE(IO,9038)                ISC11940
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) WRITE(IO,9039)                ISC11950
      WRITE(IO,9040) (GRIDX(I),I=1,NXPNTS)                               ISC11960
      IF(ISW(2) .EQ. 1 .OR. ISW(2) .EQ. 3) WRITE(IO,9041)                ISC11970
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) WRITE(IO,9042)                ISC11980
      WRITE(IO,9040) (GRIDY(I),I=1,NYPNTS)                               ISC11990
  550 IF(NXWYPT .EQ. 0) GOTO 570                                         ISC12000
      LINE = LINE + 5 + NXWYPT/5                                         ISC12010
      IF(LINE .LT. 57) GOTO 560                                          ISC12020
      LINE = 6                                                           ISC12030
      WRITE(IO,9029) TITLE                                               ISC12040
  560 IF(ISW(3) .EQ. 1) WRITE(IO,9043)                                   ISC12050
      IF(ISW(3) .EQ. 2) WRITE(IO,9044)                                   ISC12060
      WRITE(IO,9045) (XDIS(I),YDIS(I),I=1,NXWYPT)                        ISC12070
C     PRINT TERRAIN HEIGHTS.                                             ISC12080
  570 IF(ISW(4) .NE. 1) GOTO 580                                         ISC12090
      CONDEP(3) = 4HHGT                                                  ISC12100
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,GRIDZ,99,IDY,IHR,1,0,0,0)         ISC12110
C     PRINT OUT SOURCE INFO.                                             ISC12120
  580 CONTINUE                                                           ISC12130
      LINE = 100                                                         ISC12140
      I3 = 0                                                             ISC12150
      DO 600 I = 1,NSOURC                                                ISC12160
      IF(LINE .LE. 56) GOTO 590                                          ISC12170
      WRITE(IO,9029) (TITLE(J),J=1,15)                                   ISC12180
      WRITE(IO,9046) ((IQUN(J),J=1,3),I2=1,2),(METER(1),METER(2),J=1,10)ISC12190
      LINE = 18                                                          ISC12200
  590 CONTINUE                                                           ISC12210
      ITYPE = SOURCE(1,I)                                                ISC12220
C     GET WAKE OPTION, SOURCE NO., NVS & TYPE FROM FIRST WORD.           ISC12230
      NSO = SOURCE(2,I)                                                  ISC12240
      WAKE = ITYPE/8192                                                  ISC12250
      QFLG = ITYPE/512 - (ITYPE/8192)*16                                 ISC12260
      NVS = ITYPE/16 - (ITYPE/512)*32                                    ISC12270
      ITYPE = ITYPE - (ITYPE/16)*16                                      ISC12280
      IF(NVS .GT. 0) I3 = 1                                              ISC12290
      WRITE(IO,9047) NSO,ITYPE,WAKE,NVS,(SOURCE(J,I),J=3,13)             ISC12300
      LINE = LINE + 1                                                    ISC12310
  600 CONTINUE                                                           ISC12320
      IF(I3 .NE. 1) GOTO 630                                             ISC12330
C     PRINT OUT PARTICLE CATEGORY INFORMATION.                           ISC12340
      LINE = 100                                                         ISC12350
      DO 620 I = 1,NSOURC                                                ISC12360
      IF(LINE .LT. 43) GOTO 610                                          ISC12370
      WRITE(IO,9029) (TITLE(J),J=1,15)                                   ISC12380
      WRITE(IO,9049)                                                     ISC12390
      LINE = 10                                                          ISC12400
  610 CONTINUE                                                           ISC12410
      ITYPE = SOURCE(1,I)                                                ISC12420
      NSO = SOURCE(2,I)                                                  ISC12430
      NVS = ITYPE/16 - (ITYPE/512)*32                                    ISC12440
      IF(NVS .LE. 0) GOTO 620                                            ISC12450
      WRITE(IO,9050) NSO                                                 ISC12460
      I2 = 15 + NVS                                                      ISC12470
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      WRITE(IO,9051)  (SOURCE(J,I),J=16,I2)                              ISC12480
      I2 = 35 + NVS                                                      ISC12490
      WRITE(IO,9052)  (SOURCE(J,I),J=36,I2)                              ISC12500
      I2 = 55 + NVS                                                      ISC12510
      WRITE(IO,9053) (SOURCE(J,I),J=56,I2)                               ISC12520
      LINE = LINE + 14                                                   ISC12530
  620 CONTINUE                                                           ISC12540
C     PRINT SOURCE EMISSION RATE SCALARS.                                ISC12550
  630 I = 1                                                              ISC12560
      IF(QFLGS .LT. 1 .OR. QFLGS .GT. 5) GOTO 640                        ISC12570
      DONE = .TRUE.                                                      ISC12580
      QFLG = QFLGS                                                       ISC12590
      LINE = 100                                                         ISC12600
      GOTO 670                                                           ISC12610
  640 DONE = .FALSE.                                                     ISC12620
      J = 1                                                              ISC12630
  650 IF(J .GT. 5) GOTO 820                                              ISC12640
      LINE = 100                                                         ISC12650
      I = 1                                                              ISC12660
  660 IF(I .GT. NSOURC) GOTO 810                                         ISC12670
      ITYPE = SOURCE(1,I)                                                ISC12680
      QFLG = ITYPE/512 - (ITYPE/8192)*16                                 ISC12690
      IF(QFLG .NE. J) GOTO 800                                           ISC12700
      NSO = SOURCE(2,I)                                                  ISC12710
  670 GOTO (680,700,720,740,770), QFLG                                   ISC12720
  680 IF(LINE .LT. 54) GOTO 690                                          ISC12730
      WRITE(IO,9029) TITLE                                               ISC12740
      WRITE(IO,9002)                                                     ISC12750
      IF(DONE) WRITE(IO,9003)                                            ISC12760
      WRITE(IO,9004) ((SEASON(I1,I2),I1=1,2),I2=1,4)                     ISC12770
      LINE = 14                                                          ISC12780
  690 IF(.NOT.DONE) WRITE(IO,9005) NSO                                   ISC12790
      WRITE(IO,9006) (SOURCE(I1,I),I1=120,123)                           ISC12800
      IF(DONE) GOTO 820                                                  ISC12810
      LINE = LINE + 3                                                    ISC12820
      GOTO 800                                                           ISC12830
  700 IF(LINE .LT. 54) GOTO 710                                          ISC12840
      WRITE(IO,9029) TITLE                                               ISC12850
      WRITE(IO,9007)                                                     ISC12860
      IF(DONE) WRITE(IO,9003)                                            ISC12870
      WRITE(IO,9008)                                                     ISC12880
      WRITE(IO,9013)                                                     ISC12890
      LINE = 14                                                          ISC12900
  710 IF(.NOT. DONE) WRITE(IO,9009) NSO                                  ISC12910
      WRITE(IO,9010) (SOURCE(I1,I),I1=120,131)                           ISC12920
      IF(DONE) GOTO 820                                                  ISC12930
      LINE = LINE + 3                                                    ISC12940
      GOTO 800                                                           ISC12950
  720 IF(LINE .LT. 50) GOTO 730                                          ISC12960
      WRITE(IO,9029) TITLE                                               ISC12970
      WRITE(IO,9011)                                                     ISC12980
      IF(DONE) WRITE(IO,9003)                                            ISC12990
      WRITE(IO,9012)                                                     ISC13000
      WRITE(IO,9013)                                                     ISC13010
      LINE = 14                                                          ISC13020
  730 IF(.NOT.DONE) WRITE(IO,9009) NSO                                   ISC13030
      WRITE(IO,9014) (I1,SOURCE(119+I1,I),I1=1,24)                       ISC13040
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      IF(DONE) GOTO 820                                                 ISC13050
      LINE = LINE + 7                                                   ISC13060
      GOTO 800                                                          ISC13070
  740 IF(LINE .LT. 49) GOTO 750                                         ISC13080
      WRITE(IO,9029) TITLE                                              ISC13090
      WRITE(IO,9015)                                                    ISC13100
      IF(DONE) WRITE(IO,9003)                                           ISC13110
      WRITE(IO,9016) (I1,I1=1,6)                                        ISC13120
      WRITE(IO,9013)                                                    ISC13130
      LINE = 16                                                         ISC13140
  750 IF(.NOT.DONE) WRITE(IO,9009) NSO                                  ISC13150
      DO 760  I1 = 1,6                                                  ISC13160
      IFR = (I1-1)*6 + 120                                              ISC13170
      ITO = IFR + 5                                                     ISC13180
  760 WRITE(IO,9017) ATHRUF(I1),(SOURCE(I2,I),I2=IFR,ITO)               ISC13190
      IF(DONE) GOTO 820                                                 ISC13200
      LINE = LINE + 8                                                   ISC13210
      GOTO 800                                                          ISC13220
  770 IF(LINE .LT. 37) GOTO 780                                         ISC13230
      WRITE(IO,9029) TITLE                                              ISC13240
      WRITE(IO,9018)                                                    ISC13250
      IF(DONE) WRITE(IO,9003)                                           ISC13260
      WRITE(IO,9012)                                                    ISC13270
      WRITE(IO,9013)                                                    ISC13280
      LINE = 14                                                         ISC13290
  780 IF(.NOT.DONE) WRITE(IO,9009) NSO                                  ISC13300
      DO 790  I1 = 1,4                                                  ISC13310
      IFR = (I1-1)*24 + 119                                             ISC13320
      WRITE(IO,9019) SEASON(1,I1),SEASON(2,I1)                          ISC13330
  790 WRITE(IO,9014) (I2,SOURCE(I2+IFR,I),I2=1,24)                      ISC13340
      IF(DONE) GOTO 820                                                 ISC13350
      LINE = LINE + 22                                                  ISC13360
  800 I = I + 1                                                         ISC13370
      GOTO 660                                                          ISC13380
  810 J = J + 1                                                         ISC13390
      GOTO 650                                                          ISC13400
  820 CONTINUE                                                          ISC13410
      ZR = 1./ZR                                                        ISC13420
C     COMPUTE EFFECTIVE BUILDING WIDTH FOR ALL SOURCES & STORE IN       ISC13430
C     LOCATION 12 OF 'SOURCE' ARRAY.  BUILDING LENGTH & WIDTH WILL NO   ISC13440
C     LONGER BE NEEDED.  ALSO, RELOCATE AREA SOURCE COORDINATES FROM    ISC13450
C     THE SOUTHWEST CORNER TO THE CENTER OF THE AREA SOURCE.            ISC13460
      DO 830 I = 1,NSOURC                                               ISC13470
C     2/SQRT(3.14159265) = 1.1283792                                    ISC13480
      SOURCE(12,I) = 1.1283792*SQRT(SOURCE(12,I)*SOURCE(13,I))          ISC13490
      ITYPE = SOURCE(1,I)                                               ISC13500
      IF(ITYPE-(ITYPE/16)*16 .NE. 2) GOTO 830                           ISC13510
      A1 = .5*SOURCE(9,I)                                               ISC13520
      SOURCE(4,I) = SOURCE(4,I) + A1                                    ISC13530
      SOURCE(5,I) = SOURCE(5,I) + A1                                    ISC13540
  830 CONTINUE                                                          ISC13550
C     SET HEADING.                                                      ISC13560
      IF(ISW(1) .EQ. 1) GOTO 840                                        ISC13570
      CONDEP(1) = 4H  TO                                                ISC13580
      CONDEP(2) = 4HTAL                                                 ISC13590
      CONDEP(3) = 4HDEPO                                                ISC13600
      CONDEP(4) = 4HSITI                                                ISC13610
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      CONDEP(5) = 4HON                                                  ISC13620
      CONDEP(6) = 4H                                                    ISC13630
      GOTO 850                                                          ISC13640
  840 CONDEP(1) = 4HAVER                                                ISC13650
      CONDEP(2) = 4HAGE                                                 ISC13660
      CONDEP(3) = 4HCONC                                                ISC13670
      CONDEP(4) = 4HENTR                                                ISC13680
      CONDEP(5) = 4HATIO                                                ISC13690
      CONDEP(6) = 4HN                                                   ISC13700
  850 CONTINUE                                                          ISC13710
      RETURN                                                            ISC13720
 9001 FORMAT(/34X,64H*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CISC13730
     1ATEGORIES ***/60X,12H(METERS/SEC)//46X,5(F7.2,1H,))               ISC13740
 9002 FORMAT(39X,54H* SOURCE EMISSION RATE SCALARS WHICH VARY SEASONALLYISC13750
     1 *//)                                                             ISC13760
 9003 FORMAT(56X,19H* FOR ALL SOURCES *//)                              ISC13770
 9004 FORMAT(40X,4(2A4,7X)/20X,40(2H- )/)                               ISC13780
 9005 FORMAT(/20X,12HSOURCE NO. =,I6)                                   ISC13790
 9006 FORMAT(38X,4(E10.5,5X))                                           ISC13800
 9007 FORMAT(41X,51H* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY * ISC13810
     1 //)                                                              ISC13820
 9008 FORMAT(7X,51HJANUARY  FEBRUARY   MARCH     APRIL      MAY       , ISC13830
     1 58HJUNE      JULY     AUGUST   SEPTEMBER  OCTOBER  NOVEMBER  ,   ISC13840
     2  8HDECEMBER/)                                                   ISC13850
 9009 FORMAT(/13H SOURCE NO. =,I6)                                      ISC13860
 9010 FORMAT(5X,12E10.4)                                                ISC13870
 9011 FORMAT(32X,68H* SOURCE EMISSION RATE SCALARS WHICH VARY FOR EACH HISC13880
     1OUR OF THE DAY *//)                                               ISC13890
 9012 FORMAT(5X,6(14HHOUR    SCALAR,6X))                                ISC13900
 9013 FORMAT(1X,65(2H- )/)                                              ISC13910
 9014 FORMAT(4(5X,6(I3,3X,E10.5,4X)/))                                  ISC13920
 9015 FORMAT(30X,73H* SOURCE EMISSION RATE SCALARS WHICH VARY WITH STABIISC13930
     1LITY AND WIND SPEED *//)                                          ISC13940
 9016 FORMAT(16X,9HSTABILITY,29X,19HWIND SPEED CATEGORY/16X,8HCATEGORY, ISC13950
     1 9X,6(I1,14X))                                                    ISC13960
 9017 FORMAT(19X,A1,5X,6(5X,E10.5))                                     ISC13970
 9018 FORMAT(32X,68H* SOURCE EMISSION RATE SCALARS WHICH VARY SEASONALLYISC13980
     1 AND DIURNALLY *//)                                               ISC13990
 9019 FORMAT(59X,9HSEASON = ,2A4)                                       ISC14000
 9020 FORMAT(8F10.0)                                                    ISC14010
 9021 FORMAT(E8.0,1F8.0,3A4,7A4,2I2)                                    ISC14020
 9022 FORMAT(80I1)                                                      ISC14030
 9023 FORMAT(20I4)                                                      ISC14040
 9024 FORMAT(13I6)                                                      ISC14050
 9025 FORMAT(1H1,10X,63H*** ERROR ***  MET DATA REQUESTED DOES NOT MATCHISC14060
     1 MET DATA READ./10X,28H'REQUESTED/READ' VALUES ARE:/10X,          ISC14070
     2 21HSURFACE STATION NO. =,I6,1H/,I6,23H YEAR OF SURFACE DATA =,I6,ISC14080
     3 1H/,I6/10X,23HUPPER AIR STATION NO. =,I6,1H/,I6,                 ISC14090
     4 25H YEAR OF UPPER AIR DATA =,I6,1H/,I6/10X,15HRUN TERMINATED.)   ISC14100
 9026 FORMAT(1H1,10X,73H*** ERROR ***  NUMBER OF SOURCES TO BE READ EQUAISC14110
     1LS ZERO.  RUN TERMINATED.)                                        ISC14120
 9027 FORMAT(I5,2I1,I2,I1,E8.0,2F7.0,8F6.0)                             ISC14130
 9028 FORMAT(9X,I1,5F10.0)                                              ISC14140
 9029 FORMAT(1H1//32X,4H*** ,15A4,4H ***//)                             ISC14150
 9030 FORMAT(18X,40HCALCULATE (CONCENTRATION=1,DEPOSITION=2),29X,       ISC14160
     1 8HISW(1) =,I4/18X,55HRECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POISC14170
     2LAR=2 OR 4),14X,8HISW(2) =,I4/                                    ISC14180
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     3 18X,48HDISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2),21X,      ISC14190
     4 8HISW(3) =,I4/,18X,40HTERRAIN ELEVATIONS ARE READ (YES=1,NO=0),   ISC14200
     5 29X,8HISW(4) =,I4/,18X,                                           ISC14210
     6 45HCALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0),24X,8HISW(5) =,  ISC14220
     7 I4/18X,                                                           ISC14230
     8 48HLIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2),21X,          ISC14240
     9 8HISW(6) =,I4//18X,39HCOMPUTE AVERAGE CONCENTRATION (OR TOTAL,    ISC14250
     0 12H DEPOSITION)/18X,32HWITH THE FOLLOWING TIME PERIODS:/20X,      ISC14260
     1 19HHOURLY (YES=1,NO=0),48X,8HISW(7) =,I4/20X,                     ISC14270
     2 19H2-HOUR (YES=1,NO=0),48X,8HISW(8) =,I4/20X,                     ISC14280
     3 19H3-HOUR (YES=1,NO=0),48X,8HISW(9) =,I4/20X,                     ISC14290
     4 19H4-HOUR (YES=1,NO=0),47X,9HISW(10) =,I4/20X,                    ISC14300
     5 19H6-HOUR (YES=1,NO=0),47X,9HISW(11) =,I4/20X,                    ISC14310
     6 19H8-HOUR (YES=1,NO=0),47X,9HISW(12) =,I4/20X,                    ISC14320
     7 20H12-HOUR (YES=1,NO=0),46X,9HISW(13) =,I4/20X,                   ISC14330
     8 20H24-HOUR (YES=1,NO=0),46X,9HISW(14) =,I4)                       ISC14340
  9031 FORMAT(18X,35HPRINT 'N'-DAY TABLE(S) (YES=1,NO=0),33X,            ISC14350
     1 9HISW(15) =,I4//18X,58HPRINT THE FOLLOWING TYPES OF TABLES WHOSE  ISC14360
     2TIME PERIODS ARE/18X,36HSPECIFIED BY ISW(7) THROUGH ISW(14):/20X,  ISC14370
     3 25HDAILY TABLES (YES=1,NO=0),41X,9HISW(16) =,I4/20X,              ISC14380
     4 44HHIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0),22X,9HISW(17) =,  ISC14390
     5 I4/20X,30HMAXIMUM 50 TABLES (YES=1,NO=0),36X,9HISW(18) =,I4/18X,  ISC14400
     6 57HMETEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2),11X, ISC14410
     7 9HISW(19) =,I4/18X,65HRURAL-URBAN OPTION (RU.=0,UR. MODE 1=1,UR.  ISC14420
     *MODE 2=2,UR. MODE 3=3),                                            ISC14430
     8                 3X,9HISW(20) =,I4/18X,57HWIND PROFILE EXPONENT VAISC14440
     9LUES (DEFAULTS=1,USER ENTERS=2,3),11X,9HISW(21) =,I4/18X,          ISC14450
     0 64HVERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2, ISC14460
     131),4X,9HISW(22) =,I4/18X,49HSCALE EMISSION RATES FOR ALL SOURCES (ISC14470
     2NO=0,YES>0),19X,9HISW(23) =,I4/18X,53HPROGRAM CALCULATES FINAL PLUIISC14480
     3ME RISE ONLY (YES=1,NO=2),15X,9HISW(24) =,I4/18X,                  ISC14490
     4 59HPROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1),   ISC14500
     5  9X,9HISW(25) =,I4/18X                                           ISC14510
     6  ,'PROGRAM USES BUOYANCY INDUCED DISPERSION (YES=1,NO=2)',        ISC14520
     7  15X,'ISW(26) =',I4)                                             ISC14530
  9061 FORMAT(18X,'CONCENTRATIONS DURING CALM PERIODS SET'               ISC14540
     1 ,' = 0 (YES=1,NO=2)',13X,'ISW(27) =',I4/18X,                      ISC14550
     2 'REG. DEFAULT OPTION CHOSEN (YES=1,NO=2)',29X,                    ISC14560
     3 'ISW(28) =',I4/18X,                                               ISC14570
     4  'TYPE OF POLLUTANT TO BE MODELLED (1=SO2,2=OTHER)',              ISC14580
     5  20X,'ISW(29) =',I4/18X,                                         ISC14590
     6  'DEBUG OPTION CHOSEN (1=YES,2=NO)',36X,'ISW(30) =',I4)          ISC14600
  9032 FORMAT(/18X,23HNUMBER OF INPUT SOURCES,46X,8HNSOURC =,I4/18X,     ISC14610
     1 40HNUMBER OF SOURCE GROUPS (=0,ALL SOURCES),29X,8HNGROUP =,I4/18XISC14620
     2,53HTIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS),17X,     ISC14630
     3 7HIPERD =,I4/18X,31HNUMBER OF X (RANGE) GRID VALUES,38X,8HNXPNTS ISC14640
     4=,I4/18X,31HNUMBER OF Y (THETA) GRID VALUES,38X,8HNYPNTS =,I4/18X,ISC14650
     5 28HNUMBER OF DISCRETE RECEPTORS,41X,8HNXWYPT =,I4)                ISC14660
  9033 FORMAT(18X,46HNUMBER OF HOURS PER DAY IN METEOROLOGICAL DATA,23X, ISC14670
     1 8HNHOURS =,I4/18X,37HNUMBER OF DAYS OF METEOROLOGICAL DATA,32X,   ISC14680
     2 8H NDAYS =,I4)                                                    ISC14690
  9034 FORMAT(18X,44HSOURCE EMISSION RATE UNITS CONVERSION FACTOR,27X,   ISC14700
     1 6H   TK=,E10.5/18X,                                               ISC14710
     4 52HHEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED,18X,      ISC14720
     5 7H   ZR =,F7.2,8H  METERS/18X,                                    ISC14730
     6 42HLOGICAL UNIT NUMBER OF METEOROLOGICAL DATA,29X,6HIMET =,I4)    ISC14740
  9035 FORMAT(18X,52HDECAY COEFFICIENT FOR PHYSICAL OR CHEMICAL DEPLETIONISC14750
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     1 ,18X,7HDECAY =,E12.6/18X,19HSURFACE STATION NO.,                    ISC14760
     3 53X,5HISS =,I6/18X,20HYEAR OF SURFACE DATA,52X,5HISY =,I3/18X,      ISC14770
     4 21HUPPER AIR STATION NO.,51X,5HIUS =,I6/18X,                        ISC14780
     5 22HYEAR OF UPPER AIR DATA,50X,5HIUY =,I3)                           ISC14790
 9036 FORMAT(18X,39HLOGICAL UNIT OF CALCULAT.ON 'SAVE' TAPE,30X,           ISC14800
     1 8H ITAP  =,I4)                                                      ISC14810
 9037 FORMAT(44X,43H*** METEOROLOGICAL DAYS TO BE PROCESSED ***/           ISC14820
     1 63X,6H(IF=1)//8(11X,5(10I2,2X)/))                                   ISC14830
 9038 FORMAT(//42X,48H*** X-COORDINATES OF RECTANGULAR GRID SYSTEM ***/    ISC14840
     1 62X,8H(METERS)/)                                                    ISC14850
 9039 FORMAT(//47X,35H*** RANGES OF POLAR GRID SYSTEM ***/62X,             ISC14860
     1 8H(METERS)/)                                                        ISC14870
 9040 FORMAT(100(5X,10(F10.1,1H,)/))                                       ISC14880
 9041 FORMAT(//42X,48H*** Y-COORDINATES OF RECTANGULAR GRID SYSTEM ***     ISC14890
     1 /62X,8H(METERS)/)                                                   ISC14900
 9042 FORMAT(//45X,42H*** RADIAL ANGLES OF POLAR GRID SYSTEM ***/          ISC14910
     1 /62X,9H(DEGREES)/)                                                  ISC14920
 9043 FORMAT(//47X,45H*** X,Y COORDINATES OF DISCRETE RECEPTORS ***/       ISC14930
     1 62X,8H(METERS)/)                                                    ISC14940
 9044 FORMAT(//39X,53H*** RANGE,THETA COORDINATES OF DISCRETE RECEPTORS    ISC14950
     1***/58X,16H(METERS,DEGREES)/)                                        ISC14960
 9045 FORMAT(100(6X,5(1H(,F9.1,1H,,F9.1,4H),  )/))                         ISC14970
 9046 FORMAT(55X,19H*** SOURCE DATA ***//21X,13HEMISSION RATE,38X,         ISC14980
     1 5HTEMP.,4X,9HEXIT VEL./24X,8HTYPE=0,1,40X,2(6HTYPE=0,4X)/10X,       ISC14990
     2 3HT W,8X,3A4,38X,18H(DEG.K);  (M/SEC);,12X,3(5HBLDG.,4X)/10X,       ISC15000
     3 20HY A NUMBER     TYPE=2,25X,4HBASE,12X,53HVERT.DIM  HORZ.DIM DIAMISC15010
    4ETER  HEIGHT   LENGTH    WIDTH/3X,19HSOURCE P K  PART.  ,3A4,5X,     ISC15020
     5 1HX,8X,43HY      ELEV.   HEIGHT   TYPE=1   TYPE=1,2  ,4(6HTYPE=0,ISC15030
     6 3X)/3X,31HNUMBER E E  CATS. *PER METER**2,2(5(1X,2A4),1X)/          ISC15040
     7 63(2H -)/)                                                          ISC15050
 9047 FORMAT(I8,I3,I2,I5,3X,E11.5,2F10.1,F8.1,2F9.2,1X,5F9.2)              ISC15060
 9048 FORMAT(I8,I3,I2,I5,3X,2A4,A3,1X,2F9.1,3F9.2,1X,5F9.2)                ISC15070
 9049 FORMAT(50X,31H*** SOURCE PARTICULATE DATA ***//)                     ISC15080
 9050 FORMAT(/10X,19H*** SOURCE NUMBER =,I6,4H ***)                        ISC15090
 9051 FORMAT(/10X,15HMASS FRACTION =/2(10X,10(F7.5,1H,)/))                 ISC15100
 9052 FORMAT(/10X,31HSETTLING VELOCITY(METERS/SEC) =/2(10X,10(F7.4,1H,)    ISC15110
     1 /))                                                                 ISC15120
 9053 FORMAT(/10X,32HSURFACE REFLECTION COEFFICIENT =/2(10X,10(F7.5,1H,    ISC15130
     1 )/))                                                                ISC15140
 9054 FORMAT(34X,27H* SEASONAL SOURCE STRENGTHS,3A4,                       ISC15150
     1 26HFOR EACH HOUR OF THE DAY */20H *** SOURCE NUMBER =,I5,4H ***)    ISC15160
 9055 FORMAT(/4X,A4,A2/2(/4X,4HHOUR,I8,11I10/2X,8HSTRENGTH,12E10.4))       ISC15170
 9056 FORMAT(18X,22HALLOCATED DATA STORAGE,48X,7HLIMIT =,I6,6H WORDS/      ISC15180
     1 18X,42HREQUIRED DATA STORAGE FOR THIS PROBLEM RUN,28X,              ISC15190
     2  7HMIMIT =,I6,6H WORDS)                                             ISC15200
 9057 FORMAT(1H0,33X,65H*** NUMBER OF SOURCE NUMBERS REQUIRED TO DEFINE    ISC15210
    1SOURCE GROUPS ***/62X,8H(NSOGRP)//3(15X,20(I4,1H,)/))                 ISC15220
 9058 FORMAT(1H0,43X,45H*** SOURCE NUMBERS DEFINING SOURCE GROUPS ***/     ISC15230
     1 62X,7H(IDSOR)//8(15X,14(I6,1H,)/))                                  ISC15240
 9059 FORMAT(//51X,30H*** WIND PROFILE EXPONENTS ***//)                    ISC15250
 9060 FORMAT(//42X,48H*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***/    ISC15260
     1 53X,26H(DEGREES KELVIN PER METER)//)                                ISC15270
 9520 FORMAT(1X,8E14.5)                                                    ISC15280
 9521 FORMAT(1X,2E14.5,3A4,7A4,2I2)                                        ISC15290
 9522 FORMAT(1X,1X,80I1)                                                   ISC15300
 9523 FORMAT(1X,20I4)                                                      ISC15310
 9524 FORMAT(1X,13I6)                                                      ISC15320
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      END                                                                ISC15330
C                                                                        ISC15340
      SUBROUTINE MODEL(CALC,CHIAV,CHIAN,GRIDX,GRIDY,XDIS,YDIS,GRIDZ,     ISC15350
     1 CHIMAX,CHI50,IPNT,ICOUNT,SOURCE)                                  ISC15360
C                SUBROUTINE MODEL (VERSION 86170), PART OF ISCST.        ISC15370
C     THIS ROUTINE CONTAINS THE MODEL EQUATIONS FOR CALCULATING GROUND-  ISC15380
C     LEVEL CONCENTRATION OR DEPOSITION INCLUDING THE PLUME RISE         ISC15390
C     EQUATIONS.  THIS ROUTINE ALSO CONTROLS THE CALCULATION AND OUTPUT  ISC15400
C     OF ALL TABLES THE PROGRAM PRODUCES.                                ISC15410
C                                                                        ISC15420
      INTEGER TITLE,QFLG,QFLGS                                           ISC15430
      LOGICAL MAKE,POLAR,DONE,SGZDON,IFLAG(8),ISW24                      ISC15440
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,         ISC15450
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE,  ISC15460
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT           ISC15470
      COMMON /MET/ IDAY(366),ISTAB(24),AWS(24),TEMP(24),AFV(24),         ISC15480
     1 AFVR(24),MLH(24,2),P(24),DTHDZ(24),DECAY(24),PDEF(6,6),           ISC15490
     2 DTHDEF(6,6),ZR,DDECAY,IMET,ITAP,TK,UCATS(5)                       ISC15500
      COMMON /CALM/ NC(24),OLDAFV,NCM6(4),NCM8(3),NCM12(2),NCM24,        ISC15510
     *NCMYR,IFLAGC(8),NCM4(6)                                            ISC15520
      DIMENSION ISTORD(38)                                               ISC15530
      DIMENSION CALC(1),CHIAV(1),CHIAN(1),GRIDX(1),GRIDY(1),XDIS(1),     ISC15540
     1 YDIS(1),GRIDZ(1),CHIMAX(1),CHI50(150,1),IPNT(50,1),ICOUNT(1),     ISC15550
     2 SOURCE(215,1)                                                     ISC15560
C     SIZE OF SASIGZ,SBSIGZ ARRAYS INCREASED FROM 36 TO 38 TO ALLOW FOR  ISC15570
C     ADDITIONAL SIGMA COEFFICIENTS NECESSARY TO ALLOW FOR               ISC15580
C     SOURCE-RECEPTOR DISTANCES LESS THAN 100M.                          ISC15590
      DIMENSION COSNUM(360),SINNUM(451),RLH(48),SASIGZ(38),SBSIGZ(38),   ISC15600
     1 SP(6),SQ(6),SC(6),SD(6),KAVG(8),MSTAB(24),IMOS(11),ISEAS(12)      ISC15610
      EQUIVALENCE (COSNUM(1),SINNUM(91)),(ISW20,ISW(40)),(VS,SIGYO,XO),  ISC15620
     1 (TS,SIGZO),(POLAR,DONE),(ISW(23),QFLGS)                           ISC15630
      DATA ISTORD/9*1,3*2,3,6*4,9*5,10*6/                                ISC15640
C     NOTE IN VERSION 86170 SASIGZ AND SBSIGZ CONTAIN EXTRA TERMS        ISC15650
C     TO ALLOW FOR SOURCE-RECEPTORS DISTANCES LESS THAN 100M.            ISC15660
      DATA SASIGZ / 122.8,                                               ISC15670
     X              156.08,170.22,179.52,217.41,258.89,346.75,2*453.85,  ISC15680
     1 90.673,98.483,109.3,61.141,34.459,32.093,32.093,33.504,36.65,     ISC15690
     X  44.053,24.26,                                                    ISC15700
     2        23.331,21.628,21.628,22.534,24.703,26.97,35.42,47.618,     ISC15710
     3 15.209,14.457,13.953,13.953,14.823,16.187,17.836,22.651,27.074,   ISC15720
     4 34.219 /                                                          ISC15730
      DATA SBSIGZ /.9447,                                                ISC15740
     X               1.0542,1.0932,1.1262,1.2644,1.4094,1.7283,2*2.1166, ISC15750
     1 .93198,.98332,1.0971,.91465,.86974,.81066,.64403,.60486,.56589,   ISC15760
     X  .51179,.8366,                                                    ISC15770
     2        .81956,.75660,.63077,.57154,.50527,.46713,.37615,.29592,   ISC15780
     3 .81558,.78407,.68465,.63227,.54503,.46490,.41507,.32681,.27436,   ISC15790
     4 .21716 /                                                          ISC15800
      DATA SC,SD / 24.1667,18.333,12.5,8.333,6.25,4.1667,2.5334,1.8096,  ISC15810
     1 1.0857,.72382,.54287,.36191 /, SP,SQ / .004781486,.006474168,     ISC15820
     2 .009684292,.014649868,.019584802,.029781132,1.1235955,1.1086475,  ISC15830
     3 1.0905125,1.0881393,1.0857763,1.0881393 /                         ISC15840
      DATA KAVG / 1,2,3,4,6,8,12,24 /                                    ISC15850
      DATA IMOS / 32,61,92,122,153,183,214,245,275,306,336 /             ISC15860
      DATA ISEAS / 1,1,2,2,2,3,3,3,4,4,4,1 /                             ISC15870
C                                                                        ISC15880
C***  INITIALIZE.                                                        ISC15890
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C                                                                       ISC15900
C     THE FOLLOWING CHANGES WERE DEVELOPED BY S PERKINS 2/82            ISC15910
C     THIS MODIFICATION CHOPS TERRAIN TO STACK TOP ON A                 ISC15920
C     STACK TO STACK BASIS.                                             ISC15930
C     INITIALIZE OLDZ TO 0.                                             ISC15940
C     OLDZ RETAINS THE TERRAIN HT IF TERRAIN HT EXCEEDS STACK HT.       ISC15950
      OLDZ=0.                                                           ISC15960
      ISW24 = ISW(24) .EQ. 1                                            ISC15970
C     INITIALIZE COSNUM & SINNUM ARRAYS WITH COSINE & SINE VALUES OF    ISC15980
C     INTEGER WIND DIRECTIONS.                                          ISC15990
      DO 10  I = 1,451                                                  ISC16000
      A1 = I                                                            ISC16010
   10 SINNUM(I) = SIN(A1*.0174533293)                                   ISC16020
C     IF MAX 50 TABLES ARE NOT COMPUTED, ICOUNT & IPNT DO NOT EXIST.    ISC16030
      IF(ISW(18) .LE. 0) GOTO 30                                        ISC16040
C     INITIALIZE POINTER ARRAY & COUNTER FOR MAXIMUM FIFTY TABLES.      ISC16050
      I1 = NAVG                                                         ISC16060
      IF(NGROUP .GT. 0) I1 = I1*NGROUP                                  ISC16070
      DO 20  I = 1,I1                                                   ISC16080
      ICOUNT(I) = 0                                                     ISC16090
      DO 20  J = 1,50                                                   ISC16100
   20 IPNT(J,I) = J                                                     ISC16110
C     CALCULATE VIRTUAL DISTANCES FOR ALL SOURCES AND STABILITY         ISC16120
C     CATEGORIES.  ALSO CHECK SOURCE-RECEPTOR DISTANCES.                ISC16130
   30 LINE = 100                                                        ISC16140
      DO 310 I = 1,NSOURC                                               ISC16150
      ITYPE = SOURCE(1,I)                                               ISC16160
      IWAK = ITYPE/8192                                                 ISC16170
      ITYPE = ITYPE - (ITYPE/16)*16                                     ISC16180
      IF(ITYPE-1) 40 ,110,140                                           ISC16190
   40 HB = SOURCE(11,I)                                                 ISC16200
      HW = SOURCE(12,I)                                                 ISC16210
      IF(HB .LE. 0.0 .AND. HW .LE. 0.0) GOTO 160                        ISC16220
      H = HB                                                            ISC16230
      IF(HW .LT. HB) H = HW                                             ISC16240
      DO 50  J = 1,38                                                   ISC16250
C     CHECK IF M.P. VS. P.G. COEFFICIENTS                               ISC16260
      IF(ISW(20) .EQ. 3) GOTO 45                                        ISC16270
      SOURCE(81+J,I) = (1.2*H/SASIGZ(J))**(1./SBSIGZ(J)) - .01*H        ISC16280
      GOTO 50                                                           ISC16290
45    K=ISTORD(J)                                                       ISC16300
      XX=1.2*H                                                          ISC16310
      SOURCE(81+J,I)=XVZ(XX,K)-.01*H                                    ISC16320
50    CONTINUE                                                          ISC16330
      IF(HW .GE. HB) GOTO 70                                            ISC16340
      DO 60  J = 1,6                                                    ISC16350
      IF(ISW(20) .EQ. 3) GOTO 55                                        ISC16360
      SOURCE(75+J,I) = (.65*HW*SP(J))**SQ(J) - .01*HW                   ISC16370
      GOTO 60                                                           ISC16380
55    XX=.65*HW                                                         ISC16390
      SOURCE(75+J,I)=XVY(XX,J)-.01*HW                                   ISC16400
60    CONTINUE                                                          ISC16410
      GOTO 160                                                          ISC16420
   70 IF(HW .GT. 5.*HB) GOTO 90                                         ISC16430
      DO 80  J = 1,6                                                    ISC16440
      IF(ISW(20) .EQ. 3) GOTO 75                                        ISC16450
      SOURCE(75+J,I) = ((.35*HW+.5*HB)*SP(J))**SQ(J) - .01*HB           ISC16460
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      GOTO 80                                                          ISC16470
75    XX=.35*HW+.5*HB                                                  ISC16480
      SOURCE(75+J,I)=XVY(XX,J)-.01*HB                                  ISC16490
80    CONTINUE                                                         ISC16500
      GOTO 160                                                         ISC16510
   90 H = .85*HB                                                       ISC16520
      IF(IWAK .EQ. 1) H = 2.25*HB                                      ISC16530
      DO 100 J = 1,6                                                   ISC16540
      IF(ISW(20).EQ.3)GOTO 95                                          ISC16550
      SOURCE(75+J,I) = (H*SP(J))**SQ(J) - .01*HB                       ISC16560
      GOTO 100                                                         ISC16570
95    SOURCE(75+J,I)=XVY(H,J)-.01*HB                                   ISC16580
100   CONTINUE                                                         ISC16590
      GOTO 160                                                         ISC16600
  110 SIGYO = SOURCE(9,I)                                              ISC16610
      SIGZO = SOURCE(8,I)                                              ISC16620
      DO 120 J = 1,6                                                   ISC16630
      IF(SIGYO .LE. 0.) GOTO 120                                       ISC16640
      IF(ISW(20) .NE. 3) SOURCE(75+J,I) = (SIGYO*SP(J))**SQ(J)         ISC16650
      IF(ISW(20) .EQ. 3) SOURCE(75+J,I)=XVY(SIGYO,J)                   ISC16660
120   CONTINUE                                                         ISC16670
      DO 130 J = 1,38                                                  ISC16680
      IF(SIGZO .LE. 0.0) GOTO 130                                      ISC16690
      IF (ISW(20) .EQ. 3) GOTO 125                                     ISC16700
                          SOURCE(81+J,I) = (SIGZO/SASIGZ(J))**         ISC16710
     1                                     (1./SBSIGZ(J))            ISC16720
      GOTO 130                                                         ISC16730
125   K=ISTORD(J)                                                      ISC16740
      SOURCE(81+J,I)=XVZ(SIGZO,K)                                      ISC16750
130   CONTINUE                                                         ISC16760
      GOTO 160                                                         ISC16770
  140 XO = SOURCE(9,I)                                                 ISC16780
      DO 150 J = 1,38                                                  ISC16790
  150 SOURCE(81+J,I) = .001*XO                                         ISC16800
C     NO VIRTUAL DISTANCES CAN BE LESS THAN ZERO.                      ISC16810
  160 DO 170 J = 1,6                                                   ISC16820
  170 IF(SOURCE(75+J,I) .LT. 0.0) SOURCE(75+J,I) = 0.0                 ISC16830
      DO 180 J = 1,38                                                  ISC16840
  180 IF(SOURCE(81+J,I) .LT. 0.0) SOURCE(81+J,I) = 0.0                 ISC16850
  190 A1=.99                                                           ISC16860
      IF(ITYPE-1) 200  ,210  ,220                                      ISC16870
  200 XOP = 0.0                                                        ISC16880
      H = HB                                                           ISC16890
      IF(HW .LT. HB) H = HW                                            ISC16900
      A1 = 3.*H                                                        ISC16910
      IF(A1 .LT. 00.99) A1 = 00.99                                     ISC16920
      GOTO 230                                                         ISC16930
  210 XOP = 2.15*SIGYO                                                 ISC16940
      GOTO 230                                                         ISC16950
  220 XOP = .5641896*SOURCE(9,I)                                       ISC16960
  230 NSO = SOURCE(2,I)                                                ISC16970
      XS = SOURCE(4,I)                                                 ISC16980
      YS = SOURCE(5,I)                                                 ISC16990
      IF(NXPNTS .EQ. 0 .OR. NYPNTS .EQ. 0) GOTO 270                    ISC17000
      POLAR = .FALSE.                                                  ISC17010
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) POLAR = .TRUE.              ISC17020
      DO 260   J = 1,NYPNTS                                            ISC17030
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      YR = GRIDY(J)                                                     ISC17040
      I1 = YR                                                           ISC17050
      DO 260   K = 1,NXPNTS                                             ISC17060
      XR = GRIDX(K)                                                     ISC17070
      IF(.NOT.POLAR) GOTO 240                                           ISC17080
      YR = XR*COSNUM(I1)                                                ISC17090
      XR = XR*SINNUM(I1)                                                ISC17100
  240 A3 = YR - YS                                                      ISC17110
      XR = XR - XS                                                      ISC17120
      A2 = SQRT(XR*XR + A3*A3) - XOP                                    ISC17130
      IF(A2 .GE. A1) GOTO 260                                           ISC17140
      IF(LINE .LT. 57) GOTO 250                                         ISC17150
      WRITE(IO,9011)                                                    ISC17160
      WRITE(IO,9005) TITLE                                              ISC17170
      WRITE(IO,9002) CONDEP                                             ISC17180
      LINE = 16                                                         ISC17190
  250 WRITE(IO,9003) NSO,GRIDX(K),GRIDY(J),A2                           ISC17200
      LINE = LINE + 1                                                   ISC17210
  260 CONTINUE                                                          ISC17220
  270 IF(NXWYPT .EQ. 0) GOTO 310                                        ISC17230
      POLAR = .FALSE.                                                   ISC17240
      IF(ISW(3) .EQ. 2) POLAR = .TRUE.                                  ISC17250
      DO 300   J = 1,NXWYPT                                             ISC17260
      YR = YDIS(J)                                                      ISC17270
      XR = XDIS(J)                                                      ISC17280
      IF(.NOT.POLAR) GOTO 280                                           ISC17290
      I1 = YR                                                           ISC17300
      YR = XR*COSNUM(I1)                                                ISC17310
      XR = XR*SINNUM(I1)                                                ISC17320
  280 YR = YR - YS                                                      ISC17330
      XR = XR - XS                                                      ISC17340
      A2 = SQRT(XR*XR + YR*YR) - XOP                                    ISC17350
      IF(A2 .GE. A1) GOTO 300                                           ISC17360
      IF(LINE .LT. 57) GOTO 290                                         ISC17370
      WRITE(IO,9005) TITLE                                              ISC17380
      WRITE(IO,9002) CONDEP                                             ISC17390
      LINE = 16                                                         ISC17400
  290 WRITE(IO,9003) NSO,XDIS(J),YDIS(J),A2                             ISC17410
      LINE = LINE + 1                                                   ISC17420
  300 CONTINUE                                                          ISC17430
  310 CONTINUE                                                          ISC17440
C     INITIALIZE NUMBER DAYS, HOURS & HOURS PER DAY. SET MIXING HEIGHT  ISC17450
C     INDEX.                                                            ISC17460
      NTDAY = 0                                                         ISC17470
      IF(ISW(19) .GT. 1) GOTO 320                                       ISC17480
      NHOURS = 24                                                       ISC17490
  320 IHM = 1                                                           ISC17500
      IF(ISW(20) .GT. 0) IHM = 2                                        ISC17510
C                                                                       ISC17520
C***  BEGIN LOOP OVER DAYS OF METEOROLOGICAL DATA.                      ISC17530
C     SET OLD WIND DIRECTION BEFORE CALLING SUBROUTINE                  ISC17540
C     FOR CALMPRO OPTION                                                ISC17550
      OLDAFV=-1                                                         ISC17560
C     SET NO. OF CALMS PER YEAR COUNTER TO ZERO                         ISC17570
      NCMYR=0                                                           ISC17580
C                                                                       ISC17590
      DO 1690 IDY = 1,NDAYS                                             ISC17600
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      IF(ISW(19) .EQ. 1) GOTO 380                                          ISC17610
C     INPUT A DAY OF CARD MET DATA.                                        ISC17620
      DO 370 I = 1,NHOURS                                                  ISC17630
      READ(IMET,9004) JDAY,AFV(I),AWS(I),HLH(I,IHM),TEMP(I),DTHDZ(I),      ISC17640
     1 ISTAB(I),P(I),DECAY(I)                                              ISC17650
C     NOTE IF REG. DEFAULT OPTION IS CHOSEN AND SO2 IS                     ISC17660
C     MODELLED IN AN URBAN MODE DECAY IS SET = .0000481. S**-1(4 HR)       ISC17670
      IF(ISW(28).EQ.1.AND.ISW(29).EQ.1.AND .ISW(20).GT.0)                  ISC17680
     1  DECAY(I)=.0000481                                                  ISC17690
      IF(ISTAB(I) .GT. 6) ISTAB(I) = 6                                     ISC17700
      AFVR(I) = AFV(I)                                                     ISC17710
      IF(JDAY .LT. 1) JDAY = 1                                             ISC17720
      IF(I.EQ.1) JDY=JDAY                                                  ISC17730
      IF(ISW(21) .EQ. 3 .AND. ISW(22) .EQ. 3) GOTO 350                     ISC17740
C     COMPUTE WIND SPEED CATEGORY IN ORDER TO LOAD DEFAULT VALUE FOR       ISC17750
C     P OR DTHDZ.                                                          ISC17760
      IST = ISTAB(I)                                                       ISC17770
      DO 330 J = 1,5                                                       ISC17780
      ISP = J                                                              ISC17790
      IF(UCATS(J) .GE. AWS(I)) GOTO 340                                    ISC17800
  330 CONTINUE                                                             ISC17810
      ISP = 6                                                              ISC17820
  340 IF(ISW(21) .NE. 3) P(I) = PDEF(ISP,IST)                              ISC17830
      IF(ISW(22) .NE. 3) DTHDZ(I) = DTHDEF(ISP,IST)                        ISC17840
  350 IF(ISW(6) .NE. 2) GOTO 370                                           ISC17850
      IF(I .GT. 1) GOTO 360                                                ISC17860
      WRITE(IO,9001) JDAY                                                  ISC17870
      WRITE(IO,9005) TITLE                                                 ISC17880
      WRITE(IO,9007) JDAY                                                  ISC17890
      WRITE(IO,9006)                                                       ISC17900
  360 WRITE(IO,9008) I,AFV(I),AWS(I),HLH(I,IHM),TEMP(I),DTHDZ(I),          ISC17910
     1 ISTAB(I),P(I),DECAY(I)                                              ISC17920
  370 CONTINUE                                                             ISC17930
      LINE = 0                                                             ISC17940
      GOTO 480                                                             ISC17950
C     INPUT PRE-PROCESSED MET DATA.                                        ISC17960
  380 IF(IDAY(IDY) .GT. 0) GOTO 410                                        ISC17970
      I1 = IDY + 1                                                         ISC17980
      IF(IDAY(I1) .GT. 0) GOTO 390                                         ISC17990
      READ(IMET) ISTAB                                                     ISC18000
      GOTO 1690                                                            ISC18010
  390 READ(IMET) JYR,IMO,DAY,ISTAB                                         ISC18020
      LSTAB = ISTAB(1)                                                     ISC18030
      IF(LSTAB .GT. 6) LSTAB = 6                                           ISC18040
      DO 400 I = 2,24                                                      ISC18050
      IF(ISTAB(I) .GT. 6) ISTAB(I) = 6                                     ISC18060
      KSTT = ISTAB(I) - LSTAB                                              ISC18070
      IF(KSTT .GT. 1) ISTAB(I) = LSTAB + 1                                 ISC18080
      IF(KSTT .LT. -1) ISTAB(I) = LSTAB - 1                                ISC18090
  400 LSTAB = ISTAB(I)                                                     ISC18100
      GOTO 1690                                                            ISC18110
  410 READ(IMET) JYR,IMO,DAY,ISTAB,AWS,TEMP,AFV,AFVR,HLH                   ISC18120
C     REARRANGE MIXING HEIGHTS.                                            ISC18130
      DO 420 I = 1,2                                                       ISC18140
      DO 420 J = 1,24                                                      ISC18150
      K = (24*(I-1)) + J                                                   ISC18160
  420 RLH(K) = HLH(J,I)                                                    ISC18170
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      DO 430 I = 1,48,2                                                 ISC18180
      J = .5*I + 1                                                      ISC18190
  430 HLH(J,1) = RLH(I)                                                 ISC18200
      DO 440 I = 2,49,2                                                 ISC18210
      J = .5*I                                                          ISC18220
  440 HLH(J,2) = RLH(I)                                                 ISC18230
      IF(IDY .EQ. 1) LSTAB = ISTAB(1)                                   ISC18240
      IF(LSTAB .GT. 6) LSTAB = 6                                        ISC18250
C     DO NOT ALLOW STABILITY TO VARY RAPIDLY & ADJUST FOR URBAN MODES.  ISC18260
      DO 460 I = 1,24                                                   ISC18270
      IF(ISTAB(I) .GT. 6) ISTAB(I) = 6                                  ISC18280
      MSTAB(I) = ISTAB(I)                                               ISC18290
      KSTT = ISTAB(I) - LSTAB                                           ISC18300
      IF(KSTT .GT. 1) ISTAB(I) = LSTAB + 1                              ISC18310
      IF(KSTT .LT. -1) ISTAB(I) = LSTAB - 1                             ISC18320
      IF(ISW(20) .EQ. 0 .OR. ISW(20) .EQ. 3) GOTO 460                   ISC18330
      IF(ISW(20) .EQ. 1) GOTO 450                                       ISC18340
      IF(ISTAB(I) .EQ. 6) ISTAB(I) = ISTAB(I) - 1                       ISC18350
      GOTO 460                                                          ISC18360
  450 IF(ISTAB(I) .GT. 4) ISTAB(I) = 4                                  ISC18370
  460 LSTAB = ISTAB(I)                                                  ISC18380
      IF(ISW(6) .NE. 2) GOTO 480                                        ISC18390
      WRITE(IO,9001) IDY                                                ISC18400
      WRITE(IO,9005) TITLE                                              ISC18410
      WRITE(IO,9007) IDY                                                ISC18420
      WRITE(IO,9009)                                                    ISC18430
      DO 470 I = 1,24                                                   ISC18440
  470 WRITE(IO,9010) I,AFV(I),AFVR(I),AWS(I),HLH(I,IHM),TEMP(I),        ISC18450
     1 MSTAB(I),ISTAB(I)                                                ISC18460
      LINE = 0                                                          ISC18470
  480 CONTINUE                                                          ISC18480
C     DETERMINE CALM HOURS FOR EACH AVERAGING PERIOD IF CALM OPTION USEDISC18490
      IF(ISW(27) .EQ. 1) CALL NMCALM(IDY)                               ISC18500
C     SET JULIAN DAY.                                                   ISC18510
      IF(ISW(19) .EQ. 1) JDY = IDY                                      ISC18520
C     FETCH SEASON & MONTH.                                             ISC18530
      IF(ISW(19) .EQ. 1) GOTO 500                                       ISC18540
      DO 490 I = 1,11                                                   ISC18550
      IMO = I                                                           ISC18560
      IF(IMOS(I) .GT. JDY) GOTO 500                                     ISC18570
  490 CONTINUE                                                          ISC18580
      IMO = 12                                                          ISC18590
  500 CONTINUE                                                          ISC18600
      ISEA = ISEAS(IMO)                                                 ISC18610
C                                                                       ISC18620
C***  BEGIN LOOP OVER MET DATA FOR EACH HOUR.                           ISC18630
C                                                                       ISC18640
C     INITIALIZE CALM FLAGS FOR EACH AVERAGING TIME                     ISC18650
      DO 505 K=1,8                                                      ISC18660
  505 IFLAGC(K)=0                                                       ISC18670
      DO 1670 IHR = 1,NHOURS                                            ISC18680
      IST = ISTAB(IHR)                                                  ISC18690
C     IF URBAN MODE 2, ADJUST STABILITY FOR CALCULATION OF SIGY & SIGZ. ISC18700
      ISTUM2 = IST                                                      ISC18710
      IF(ISW(20) .EQ. 2) ISTUM2 = IST - 1                               ISC18720
      IF(ISTUM2 .LT. 1) ISTUM2 = 1                                      ISC18730
      UBAR = AWS(IHR)                                                   ISC18740
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      FV = AFV(IHR)                                                     ISC18750
      FVR = AFVR(IHR)                                                   ISC18760
      HM = HLH(IHR,IHM)                                                 ISC18770
C     SET MIXING HEIGHT TO 10000.0 SO THAT ONLY FIRST TERM OF VERTICAL  ISC18780
C     EQUATION IS COMPUTED (RURAL MODE, E & F STABILITIES ONLY).        ISC18790
      IF(ISW(20) .EQ. 0 .AND. IST .GT. 4) HM = 10000.0                  ISC18800
      IF (ISW(20) .EQ. 3 .AND. IST .GT. 4) HM=10000.0                   ISC18810
      TA = TEMP(IHR)                                                    ISC18820
      IF(HM .GT. 0.0) HMI = 1./HM                                       ISC18830
C     COMPUTE WIND SPEED CATEGORY FOR THIS HOUR.                        ISC18840
      DO 510 I = 1,5                                                    ISC18850
      ISP = I                                                           ISC18860
      IF(UCATS(I) .GE. UBAR) GOTO 520                                   ISC18870
  510 CONTINUE                                                          ISC18880
      ISP = 6                                                           ISC18890
  520 IF(ISW(19) .EQ. 2) GOTO 530                                       ISC18900
      PP = PDEF(ISP,IST)                                                ISC18910
      DTH = DTHDEF(ISP,IST)                                             ISC18920
      DECAY(IHR) = DDECAY                                               ISC18930
      GOTO 540                                                          ISC18940
  530 PP = P(IHR)                                                       ISC18950
      DTH = DTHDZ(IHR)                                                  ISC18960
  540 CONTINUE                                                          ISC18970
C     CLEAR CALCULATION ARRAY FOR SOURCE SUMMATIONS.                    ISC18980
      NPNTS2 = NPNTS + NPNTS                                            ISC18990
      DO 550 I = 1,NPNTS2                                               ISC19000
  550 CALC(I) = 0.0                                                     ISC19010
C     SET IFLAG FOR DAILY TABLES IF HOUR/TIME PERIOD = INTEGER MULTIPLE.ISC19020
      DO 560  I = 1,8                                                   ISC19030
      IF(ISW(I+6) .NE. 1) GOTO 560                                      ISC19040
      IFLAG(I) = .FALSE.                                                ISC19050
      IF(MOD(IHR,KAVG(I)) .EQ. 0) IFLAG(I) = .TRUE.                     ISC19060
  560 CONTINUE                                                          ISC19070
      IF(HM .LE. 0.0) GOTO 1490                                         ISC19080
C     SET CONCENTRATION TO ZERO FOR CALM OPTION                         ISC19090
      IF(ISW(27) .EQ. 1 .AND. NC(IHR) .EQ. 1) GO TO 1490                ISC19100
C     COMPUTE X & Y SCALARS OF RANDOM FLOW VECTOR.                      ISC19110
      FVRCOS = (FVR+180.)*.017453293                                    ISC19120
      FVRSIN = SIN(FVRCOS)                                              ISC19130
      FVRCOS = COS(FVRCOS)                                              ISC19140
C                                                                       ISC19150
C***  BEGIN LOOP OVER SOURCES.                                          ISC19160
C                                                                       ISC19170
      DO 1480 IS = 1,NSOURC                                             ISC19180
C     CLEAR CALCULATION ARRAY FOR EACH SOURCE.                          ISC19190
      DO 570 I = 1,NPNTS                                                ISC19200
  570 CALC(I) = 0.0                                                     ISC19210
      HS = SOURCE(7,IS)                                                 ISC19220
      IF(HS .GT. HM) GOTO 1480                                          ISC19230
      ITYPE = SOURCE(1,IS)                                              ISC19240
      XS = SOURCE(4,IS)                                                 ISC19250
      YS = SOURCE(5,IS)                                                 ISC19260
      ZS = SOURCE(6,IS)                                                 ISC19270
      VS = SOURCE(9,IS)                                                 ISC19280
      HB = SOURCE(11,IS)                                                ISC19290
      HW = SOURCE(12,IS)                                                ISC19300
      D = SOURCE(10,IS)                                                 ISC19310
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      TS = SOURCE(8,IS)                                                 ISC19320
      NSO = SOURCE(2,IS)                                                ISC19330
      IWAK = ITYPE/8192                                                 ISC19340
      QFLG = ITYPE/512 - (ITYPE/8192)*16                                ISC19350
      NVS = ITYPE/16 - (ITYPE/512)*32                                   ISC19360
      ITYPE = ITYPE - (ITYPE/16)*16                                     ISC19370
      XY = SOURCE(ISTUM2+75,IS)                                         ISC19380
      XMAX = 0.0                                                        ISC19390
C     RETRIEVE SOURCE EMISSIONS RATE (IF ANY).                          ISC19400
      QTK = 1.0                                                         ISC19410
      IF(QFLG .LE. 0 .AND. QFLGS .LE. 0) GOTO 640                       ISC19420
      I1 = IS                                                           ISC19430
      IF(QFLGS .LE. 0) GOTO 580                                         ISC19440
      I1 = 1                                                            ISC19450
      QFLG = QFLGS                                                      ISC19460
  580 I2 = ISEA                                                         ISC19470
      GOTO (630,590 ,600 ,610 ,620 ) ,QFLG                              ISC19480
  590 I2 = IMO                                                          ISC19490
      GOTO 630                                                          ISC19500
  600 I2 = IHR                                                          ISC19510
      GOTO 630                                                          ISC19520
  610 I2 = (IST-1)*6 + ISP                                              ISC19530
      GOTO 630                                                          ISC19540
  620 I2 = (ISEA - 1)*24 + IHR                                          ISC19550
  630 QTK = SOURCE(I2+119,I1)                                           ISC19560
  640 QTK = SOURCE(3,IS)*TK*QTK                                         ISC19570
C     CALCULATE EFFECTIVE WIND SPEED.                                   ISC19580
      UBARS = UBAR                                                      ISC19590
      IF(PP) 670,670,650                                                ISC19600
  650 IF(HS) 670,670,660                                                ISC19610
C     NOTE:   ZR IS IN RECIPROCAL FORM.                                 ISC19620
  660 A1 = HS                                                           ISC19630
      IF(HS .LT. 10.0) A1 = AMIN1(10.0,1./ZR)                           ISC19640
      UBARS = UBAR*(A1*ZR)**PP                                          ISC19650
  670 UBARI = 1./UBARS                                                  ISC19660
C     BEGIN PLUME RISE CALCULATIONS FOR STACK-TYPE SOURCES.             ISC19670
      IF(ITYPE-1) 680,680,680                                           ISC19680
  680 WAKE = .FALSE.                                                    ISC19690
C     CHECK FOR DOWNWASH STACK HEIGHT ADJUSTMENT                        ISC19700
      IF(ISW(25) .EQ. 2 .AND. VS .LT. 1.5*UBARS) HS = HS + (VS*UBARI    ISC19710
     1 -1.5)*(D+D)                                                      ISC19720
      IF(HS.LT.0.0) HS=0.0                                              ISC19730
      IF(DTH .LE. 0.0) GOTO 710                                         ISC19740
      S = 9.8*DTH/TA                                                    ISC19750
      SI = 1./S                                                         ISC19760
      SS = SQRT(S)                                                      ISC19770
      SSI = 1./SS                                                       ISC19780
  710 CONTINUE                                                          ISC19790
C     IF SOURCE TEMP LE AMBIENT TEMP, SET SOURCE TEMP                   ISC19800
C     EQUAL TO THE AMBIENT TEMP                                         ISC19810
      IF(TS.LT.TA) TS=TA                                                ISC19820
      TOT=TA/TS                                                         ISC19830
      VSD=VS*D                                                          ISC19840
      FM=TOT*VSD*VSD*.25                                                ISC19850
      F=2.45153*VSD*D*(1.-TOT)                                          ISC19860
      IF(F.LT.0.) F=0.0                                                 ISC19870
      IF(VS.LE.0.0) THEN                                                ISC19880
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      BETAJ=1./3.                                                          ISC19890
      ELSE                                                                 ISC19900
      BETAJ=1./3.+UBARS/VS                                                 ISC19910
      ENDIF                                                                ISC19920
      BETAJ=BETAJ*BETAJ                                                    ISC19930
      BETAJI=1./BETAJ                                                      ISC19940
      IF(HB .LE. 0.0) GOTO 800                                             ISC19950
C     PLUME RISE USED TO DETERMINE WAKE EFFECTS IS                         ISC19960
C     FROM UNAMAP 5, ISC MOMENTUM RISE AT 2 HB                             ISC19970
      IF(DTH .GT. 0.0) GOTO 780                                            ISC19980
C     UNSTABLE CONDITIONS                                                  ISC19990
C     CALCULATE MAX DOWNWIND DISTANCE                                      ISC20000
      IF(F.EQ.0.) THEN                                                     ISC20010
      DMAX=4.*D*UBARI/VS*(VS+3.*UBARS)**2                                  ISC20020
      ELSE                                                                 ISC20030
      XSTAR=14*F**.625                                                     ISC20040
      IF(F.GT.55.) XSTAR=34*F**.4                                          ISC20050
      DMAX=3.5*XSTAR                                                       ISC20060
      ENDIF                                                                ISC20070
      XBH2=HB+HB                                                           ISC20080
      IF(XBH2.GT.DMAX) XBH2=DMAX                                           ISC20090
      DHA=3.*FM*XBH2*BETAJI*UBARI*UBARI                                    ISC20100
      DHA=DHA**.33333333                                                   ISC20110
      GOTO 790                                                             ISC20120
C     STABLE CONDITIONS                                                    ISC20130
  780 DMAX=3.1415926*UBARS*SSI                                             ISC20140
      IF(F.EQ.0.) DMAX=DMAX*.5                                             ISC20150
      XBH2=HB+HB                                                           ISC20160
      IF(XBH2.GT.DMAX) XBH2=DMAX                                           ISC20170
      DHA=3.*FM*BETAJI*UBARI*SSI*SIN(SS*XBH2*UBARI)                        ISC20180
      DHA=DHA**.33333333                                                   ISC20190
C     DHA1 IS MAX MOMENTUM RISE                                            ISC20200
  790 DHA1=3.*VSD*UBARI                                                    ISC20210
      IF(DHA.GT.DHA1) DHA=DHA1                                             ISC20220
      DHAWAK=SOURCE(7,IS)+DHA                                              ISC20230
C     SOURCE(7,IS) IS UNADJUSTED STACK HEIGHT                              ISC20240
      IF(DHAWAK.LT.2.5*HB .AND. DHAWAK.LT.HB+1.5*HW) WAKE = .TRUE.         ISC20250
  800 CONTINUE                                                             ISC20260
C     MPR1 IS A SUBROUTINE WHICH CALCULATES                                ISC20270
C     PLUME RISE CONSISTENT WITH MPTER.                                    ISC20280
      CALL MPR1(IST,TS,TA,F,D,VS,UBARS,DHA,DTH,DISTF)                      ISC20290
C     DHASAV IS FINAL PLUME RISE FOR EACH SOURCE.                          ISC20300
      DHASAV=DHA                                                           ISC20310
  880 CONTINUE                                                             ISC20320
C                                                                          ISC20330
C***  BEGIN LOOP OVER RECEPTOR POINTS.                                     ISC20340
C                                                                          ISC20350
      IF(NXPNTS .NE. 0 .AND. NYPNTS .NE. 0) GOTO 900                       ISC20360
  890 IF(NXHYPT .EQ. 0) GOTO 1400                                          ISC20370
      GOTO 910                                                             ISC20380
  900 J = 0                                                                ISC20390
      POLAR = .FALSE.                                                      ISC20400
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) POLAR = .TRUE.                  ISC20410
      NEXTR = 1                                                            ISC20420
      GOTO 920                                                             ISC20430
  910 I = 0                                                                ISC20440
      NEXTR = 3                                                            ISC20450
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      POLAR = .FALSE.                                                    ISC20460
      IF(ISW(3) .EQ. 2) POLAR = .TRUE.                                   ISC20470
C     SET TERRAIN CHOPPING PARAMETERS                                    ISC20480
C     IF OLDZ EQ 0. THEN CODE WAS NOT RE-ENTERED DURING LOOP.            ISC20490
 920  IF(OLDZ.EQ.0.) GO TO 925                                           ISC20500
C     IF CODE WAS RE-ENTERED                                             ISC20510
C     SET GRIDZ(IJ) TO ORIGINAL VALUE STORED IN OLDZ                     ISC20520
C     INITIALIZE OLDZ TO 0.                                              ISC20530
      GRIDZ(IJ)=OLDZ                                                     ISC20540
      OLDZ=0.                                                            ISC20550
 925  CONTINUE                                                           ISC20560
      IF(NEXTR-2) 930,950,970                                            ISC20570
 930  J = J + 1                                                          ISC20580
      IF(J. GT. NYPNTS) GOTO 890                                         ISC20590
      YR = GRIDY(J)                                                      ISC20600
      IF(.NOT.POLAR) GOTO 940                                            ISC20610
      IYR = YR                                                           ISC20620
      YRS = SINNUM(IYR)                                                  ISC20630
      YRC = COSNUM(IYR)                                                  ISC20640
 940  IJ = (J-1)*NXPNTS                                                  ISC20650
      I = 0                                                              ISC20660
      NEXTR = 2                                                          ISC20670
 950  I = I + 1                                                          ISC20680
      IF(I .LE. NXPNTS) GOTO 960                                         ISC20690
      NEXTR = 1                                                          ISC20700
      GOTO 920                                                           ISC20710
 960  IJ = IJ + 1                                                        ISC20720
      XR = GRIDX(I)                                                      ISC20730
      GOTO 990                                                           ISC20740
 970  I = I + 1                                                          ISC20750
      IF(I .GT. NXNYPT) GOTO 1400                                        ISC20760
      YR = YDIS(I)                                                       ISC20770
      IF(.NOT.POLAR) GOTO 980                                            ISC20780
      IYR = YR                                                           ISC20790
      YRS = SINNUM(IYR)                                                  ISC20800
      YRC = COSNUM(IYR)                                                  ISC20810
 980  IJ = NXPNTS*NYPNTS + I                                             ISC20820
      XR = XDIS(I)                                                       ISC20830
 990  CONTINUE                                                           ISC20840
      IF(POLAR) GOTO 1000                                                ISC20850
      XR1 = XR -XS                                                       ISC20860
      YR1 = YR - YS                                                      ISC20870
      GOTO 1010                                                          ISC20880
1000  XR1 = XR*YRS - XS                                                 ISC20890
      YR1 = XR*YRC - YS                                                  ISC20900
C     CHECK IF TERRAIN ELEVATION IS LOWER THAN STACK HEIGHT.             ISC20910
1010  IF(ISW(4).NE.1.OR.HS+ZS-GRIDZ(IJ).GT.0.0.OR.ITYPE.EQ.2) GOTO 1020 ISC20920
C     APPLY TERRAIN CHOPPING                                             ISC20930
C                                                                        ISC20940
C     GRIDZ(IJ) TERRAIN HEIGHT GREATER THAN STACK HT SO RETAIN           ISC20950
C     TERRAIN HT IN OLDZ.                                                ISC20960
C     IF OLDZ DOES NOT EQ 0. THEN TERRAIN HT HAS BEEN RETAINED           ISC20970
C     AND GRIDZ(IJ) IS SET TO THE STACK HEIGHT -.005 METERS.             ISC20980
C     TERRAIN IS NOW LESS THAN STACK HT AND WE GO TO 1020                ISC20990
      OLDZ=GRIDZ(IJ)                                                     ISC21000
      GRIDZ(IJ)=HS+ZS-.005                                               ISC21010
      GO TO 1020                                                         ISC21020
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C     CALCULATE DOWNWIND DISTANCE, XBAR.                                ISC21030
 1020 XBAR = -(XR1*FVRSIN + YR1*FVRCOS)                                  ISC21040
      IF(XBAR .LE. 0.0) GOTO 920                                         ISC21050
      IF(XMAX .LE. 0.0) GOTO 1030                                        ISC21060
      IF(XBAR .GT. XMAX .AND. ISW(4) .EQ. 0) GOTO 920                    ISC21070
C     CALCULATE CROSSWIND DISTANCE.                                      ISC21080
 1030 YBAR = XR1*FVRCOS - YR1*FVRSIN                                     ISC21090
      XOP = 0.0                                                          ISC21100
C     1./SQRT(3.14159265) = .5641896  (CALCULATE EFFECTIVE RADIUS.)      ISC21110
      IF(ITYPE .EQ. 2) XOP = .5641896*XO                                 ISC21120
      IF(ITYPE .EQ. 1) XOP = 2.15*SIGYO                                  ISC21130
      A1 = 3.*HB                                                         ISC21140
      IF(HW .LT. HB) A1 = 3.*HW                                          ISC21150
      IF(A1 .LT. 00.99) A1 = 00.99                                       ISC21160
      IF((XBAR-XOP) .LT. 0.0) GOTO 920                                   ISC21170
      A2 = SQRT(XBAR*XBAR + YBAR*YBAR) - XOP                             ISC21180
      IF(A2 .LT. A1) GOTO 920                                            ISC21190
      YP = XBAR*1.19175359                                               ISC21200
      IF(YBAR .GT. YP) GOTO 920                                          ISC21210
C     ADJUST XBAR TO DOWNWIND EDGE OF AREA SOURCE.                       ISC21220
      IF(ITYPE .EQ. 2) XBAR = XBAR - XOP                                 ISC21230
C     RESUME PLUME RISE CALCULATIONS.                                    ISC21240
      H = HS                                                             ISC21250
      IF(ITYPE .GT. 0) GOTO 1095                                         ISC21260
C     PLUME RISE IN VERSION 86170 HAS BEEN                               ISC21270
C     CHANGED TO BE CONSISTENT WITH MPTER MODEL.                         ISC21280
C     EFFECTIVE PLUME HEIGHT.                                            ISC21290
C     CHECK FOR GRADUAL PLUME RISE.                                      ISC21300
      DHA=DHASAV                                                         ISC21310
      XKM=XBAR*.001                                                      ISC21320
      XBR1=XBAR                                                          ISC21330
C     USE TRANSITIONAL RISE WITH BUILDING DOWNWASH                       ISC21340
      IF(XKM.GE.DISTF.AND..NOT.WAKE) GO TO 1085                          ISC21350
      IF(ISW(24).EQ.1.AND.ISW(26).EQ.2.AND..NOT.WAKE) GO TO 1085         ISC21360
C     DHA IS TRANSITIONAL PLUME RISE                                     ISC21370
      DHA=160.*F**0.333333*XKM**0.666667/UBARS                           ISC21380
      IF(DHA.GT.DHASAV) DHA=DHASAV                                       ISC21390
C     IF WAKE EFFECTS, CALCULATE UNAMAP 5, ISC MOMENTUM RISE             ISC21400
      IF(WAKE) THEN                                                      ISC21410
      IF(DTH.GT.0.) GO TO 1083                                           ISC21420
C     UNSTABLE CONDITIONS                                                ISC21430
C     DMAX IS MAX DOWNWIND DISTANCE                                      ISC21440
      IF(XBR1.GT.DMAX) XBR1=DMAX                                         ISC21450
      DHA1=3.*FM*XBR1*BETAJI*UBARI*UBARI                                 ISC21460
      DHA1=DHA1**.33333333                                               ISC21470
      GO TO 1084                                                         ISC21480
C     STABLE CONDITIONS                                                  ISC21490
 1083 IF(XBR1.GT.DMAX) XBR1=DMAX                                         ISC21500
      DHA1=3.*FM*BETAJI*UBARI*SSI*SIN(SS*XBR1*UBARI)                     ISC21510
      DHA1=DHA1**.33333333                                               ISC21520
C     DHA2 IS MAX ISC MOMENTUM RISE                                      ISC21530
 1084 DHA2=3.*VSD*UBARI                                                  ISC21540
      IF(DHA1.GT.DHA2) DHA1=DHA2                                         ISC21550
      IF(DHA.LT.DHA1) DHA=DHA1                                           ISC21560
C     USE GREATER OF UNAMAP 5 ISC MOMENTUM RISE AND                      ISC21570
C     TRANSITIONAL RISE                                                  ISC21580
      ENDIF                                                              ISC21590
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      H=HS+DHA                                                          ISC21600
C     USE TRANSITIONAL RISE WITH BUILDING DOWNWASH                      ISC21610
      IF(ISW(24).EQ.1.AND..NOT.WAKE) GO TO 1085                         ISC21620
      GO TO 1090                                                        ISC21630
 1085 H=HS+DHASAV                                                       ISC21640
 1090 CONTINUE                                                          ISC21650
C     ADJUST H DUE TO TERRAIN                                           ISC21660
 1095 HEFF=H                                                            ISC21670
      IF(ISW(4).NE.1.OR.ITYPE.EQ.2) GO TO 1100                          ISC21680
      A1 = ZS - GRIDZ(IJ)                                               ISC21690
      H = H + A1                                                        ISC21700
 1100 CONTINUE                                                          ISC21710
C     CHECK FOR PLUME HEIGHT GREATER THAN MIXING HEIGHT                 ISC21720
C     AT SOURCE.                                                        ISC21730
      IF(HEFF.LE.HM) GO TO 1110                                         ISC21740
      XMAX = XBAR                                                       ISC21750
C     IF POLAR & NEXTR=2 & NO TERRAIN, SKIP RINGS FOR THIS RADIAL.      ISC21760
      IF(.NOT.POLAR .OR. NEXTR .NE. 2 .OR. ISW(4) .NE. 0) GOTO 920      ISC21770
      NEXTR = 1                                                         ISC21780
      GOTO 920                                                          ISC21790
 1110 XBARK = .001*XBAR                                                 ISC21800
      XBARY = XBARK                                                     ISC21810
      XBARZ = XBARK                                                     ISC21820
C     CALL SIGMAZ TO COMPUTE EFFECTIVE DOWNWIND DISTANCE INDEX, IXDIST. ISC21830
      I1 = 3                                                            ISC21840
      IF(ITYPE .EQ. 0 .AND. .NOT.WAKE) I1 = 4                           ISC21850
      IF (ISW(20) .NE. 3)                                               ISC21860
     *CALL SIGMAZ(XBARK,SIGZ,BBAR,ISTUM2,IXDIST,I1,SASIGZ,SBSIGZ,       ISC21870
     1 SOURCE(82,IS))                                                   ISC21880
      IF (ISW(20) .EQ. 3) CALL URBBAR(XBARK,BBAR,ISTUM2,IXDIST,I1,      ISC21890
     *    SOURCE(82,IS))                                               ISC21900
C     CALCULATE LATERAL AND VERTICAL SIGMAS.                            ISC21910
      SGZDON = .FALSE.                                                  ISC21920
      IF(ITYPE .GT. 0) GOTO 1130                                        ISC21930
 1120 IF(.NOT.WAKE) GOTO 1190                                           ISC21940
      A1 = HB                                                           ISC21950
      IF(HW .LT. HB) A1 = HW                                            ISC21960
      IF(XBAR .GE. 10.*A1) GOTO 1130                                    ISC21970
      SGZDON = .TRUE.                                                   ISC21980
      SIGZ = .7*A1 + .067*(XBAR-3.*A1)                                  ISC21990
      IF(ISTUM2 .GT. 2) GOTO 1140                                       ISC22000
      IF(ISW(20) .NE. 3) GOTO 1125                                      ISC22010
      CALL URBNYZ(XBARK,ISTUM2,DUMSY,A2)                                ISC22020
      SIGZ=AMAX1(SIGZ,A2)                                               ISC22030
      GOTO 1140                                                         ISC22040
 1125 CONTINUE                                                          ISC22050
C                                                                       ISC22060
      CALL SIGMAZ(XBARK,A2,BBAR,ISTUM2,IXDIST,1,SASIGZ,SBSIGZ,DUMMY)    ISC22070
      SIGZ = AMAX1(SIGZ,A2)                                             ISC22080
      GOTO 1140                                                         ISC22090
 1130 XBARZ = XBARK + SOURCE(IXDIST+81,IS)                              ISC22100
 1140 IF(ITYPE .GT. 0) GOTO 1160                                        ISC22110
      IF(DHAWAK .GT. 1.2*HB) GOTO 1190                                  ISC22120
      IF(XBAR .GE. 10.*A1) GOTO 1180                                    ISC22130
      IF(HW .LE. 5.*HB) GOTO 1160                                       ISC22140
      IF(IWAK .EQ. 1) GOTO 1150                                         ISC22150
      SIGY = .35*HB + .067*(XBAR-3.*HB)                                 ISC22160
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      GOTO 1170                                                          ISC22170
 1150 SIGY = 1.75*HB + .067*(XBAR - 3.*HB)                               ISC22180
      GOTO 1170                                                          ISC22190
 1160 SIGY = .35*HW + .067*(XBAR - 3.*A1)                                ISC22200
 1170 IF(ISW(20) .NE. 3) GOTO 1175                                       ISC22210
      A3=XBARK+XY                                                        ISC22220
      CALL URBNYZ(A3,ISTUM2,A2,DUMSZ)                                    ISC22230
      SIGY=AMAX1(SIGY,A2)                                                ISC22240
      GOTO 1200                                                          ISC22250
 1175 IF (ISTUM2 .GT. 2) GOTO 1200                                       ISC22260
      A3 = XBARK + XY                                                    ISC22270
      TH = .017453293*(SC(ISTUM2)-SD(ISTUM2)*ALOG(A3))                   ISC22280
      A2 = 465.11628*A3*TAN(TH)                                          ISC22290
      SIGY = AMAX1(SIGY,A2)                                              ISC22300
      GOTO 1200                                                          ISC22310
 1180 XBARY = XBARK + XY                                                 ISC22320
 1190 IF (ISW(20) .NE. 3) GOTO 1195                                      ISC22330
      CALL URBNYZ(XBARY,ISTUM2,SIGY,DUMSZ)                               ISC22340
      GOTO 1200                                                          ISC22350
 1195 TH = .017453293*(SC(ISTUM2)-SD(ISTUM2)*ALOG(XBARY))                ISC22360
      SIGY = 465.11628*XBARY*TAN(TH)                                     ISC22370
 1200 IF(ISW(26).EQ.2.OR.ITYPE.GT.0) GO TO 1205                          ISC22380
C     ADJUST SIGY FOR BUOYANCY INDUCED DISPERSION                        ISC22390
      DUM=DHA/3.5                                                        ISC22400
      DUM=DUM*DUM                                                        ISC22410
      SIGY=SQRT(SIGY*SIGY+DUM)                                           ISC22420
 1205 SIGYI=1./SIGY                                                      ISC22430
      IF(ITYPE .EQ. 2) GOTO 1210                                         ISC22440
      A1 = .5*(YBAR*SIGYI)**2                                            ISC22450
      IF(A1 .GT. 50.0) GOTO 920                                          ISC22460
 1210 IF(SGZDON) GOTO 1220                                               ISC22470
      IF(ISW(20) .NE. 3) GOTO 1215                                       ISC22480
      CALL URBNYZ(XBARZ,ISTUM2,DUMSY,SIGZ)                               ISC22490
      GOTO 1218                                                          ISC22500
 1215 CONTINUE                                                           ISC22510
      CALL SIGMAZ(XBARZ,SIGZ,BBAR,ISTUM2,IXDIST,1,SASIGZ,SBSIGZ,DUMMY)   ISC22520
 1218 CONTINUE                                                           ISC22530
 1220 IF(ISW(26).EQ.2.OR.ITYPE.GT.0) GO TO 1225                          ISC22540
C     ADJUST SIGZ FOR BUOYANCY INDUCED DISPERSION                        ISC22550
      SIGZ=SQRT(SIGZ*SIGZ+DUM)                                           ISC22560
 1225 IF(SIGZ.GT.5000..AND.NVS.EQ.0) SIGZ=5000.                          ISC22570
      SIGZI=1./SIGZ                                                      ISC22580
C     CALCULATE DECAY TERM.                                              ISC22590
      XBARU = XBAR*UBARI                                                 ISC22600
                                                                         ISC22610
      DECAYT = 1.0                                                       ISC22620
      IF(DECAY(IHR) .GT. 0.0) DECAYT = EXP(-DECAY(IHR)*XBARU)            ISC22630
C     CHECK CONCENTRATION-DEPOSITION SWITCH.                             ISC22640
      IF(ISW(1) .EQ. 2) GOTO 1320                                        ISC22650
C     CONCENTRATION EQUATION.                                            ISC22660
C     CHECK FOR PARTICULATES WITH SETTLING VELOCITIES.                   ISC22670
      IF(NVS .GT. 0) GOTO 1260                                           ISC22680
      IF(SIGZ*HMI .LT. 1.6) GOTO 1240                                    ISC22690
C     CALCULATE 'BOX-MODEL' CONCENTRATION                                ISC22700
      IF(ITYPE .EQ. 2) GOTO 1230                                         ISC22710
      CHI = QTK*UBARI*SIGYI*HMI*EXP(-A1)*DECAYT*.39894228                ISC22720
      GOTO 1390                                                          ISC22730
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 1230 A3 = .70710678*SIGYI                                              ISC22740
      A4 = (XOP+YBAR)*A3                                                ISC22750
      A5 = -(XOP-YBAR)*A3                                               ISC22760
      A3 = ERFX(A4,A5)                                                  ISC22770
      CHI = QTK*XO*HMI*UBARI*A3*.5*DECAYT                               ISC22780
      GOTO 1390                                                         ISC22790
C     CALCULATE VERTICAL TERM FOR ALL SOURCE TYPES W/O PARTICLE         ISC22800
C     SETTLING VELOCITIES.                                              ISC22810
 1240 V = 0.0                                                           ISC22820
      A2 = 0.0                                                          ISC22830
 1250 VL = V                                                            ISC22840
      A2 = A2 + 2.0                                                     ISC22850
      HMA2 = A2*HM                                                      ISC22860
      A3 = (HMA2-H)*SIGZI                                               ISC22870
      A4 = (HMA2+H)*SIGZI                                               ISC22880
      A3 = -.5*A3*A3                                                    ISC22890
      A4 = -.5*A4*A4                                                    ISC22900
      A5 = 0.0                                                          ISC22910
      IF(A3 .GT. -50.) A5 = EXP(A3)                                     ISC22920
      A6 = 0.0                                                          ISC22930
      IF(A4 .GT. -50.) A6 = EXP(A4)                                     ISC22940
      V = V + A5 + A6                                                   ISC22950
      IF(ABS(V-VL) .GT. 1.E-8) GOTO 1250                                ISC22960
      A2 = H*SIGZI                                                      ISC22970
      V = EXP(-.5*A2*A2) + V                                            ISC22980
      GOTO 1300                                                         ISC22990
C     CALCULATE VERTICAL TERM FOR ALL SOURCE TYPES WITH SETTLING        ISC23000
C     VELOCITIES.                                                       ISC23010
 1260 V = 0.0                                                           ISC23020
      DO 1290 K=1,NVS                                                   ISC23030
      SUM = 0.0                                                         ISC23040
      SUM1 = 0.0                                                        ISC23050
      JP70 = K + 35                                                     ISC23060
      XBARUV = SOURCE(JP70,IS)*XBARU                                    ISC23070
      JP70 = K + 55                                                     ISC23080
      GAMMA = SOURCE(JP70,IS)                                           ISC23090
      JP70 = K + 15                                                     ISC23100
      PHI = SOURCE(JP70,IS)                                             ISC23110
      A2 = 0.0                                                          ISC23120
      A3 = (-H+XBARUV)*SIGZI                                            ISC23130
      A5 = -.5*A3*A3                                                    ISC23140
      IF(A5 .GT. -50.) SUM = EXP(A5)                                    ISC23150
      IF(GAMMA .LE. 0.0) GOTO 1270                                      ISC23160
      A4 = (H - XBARUV)*SIGZI                                           ISC23170
      A5 = -.5*A4*A4                                                    ISC23180
      IF(A5 .GT. -50.) SUM = SUM + EXP(A5)*GAMMA                        ISC23190
      CALL VERT(H,HM,XBARUV,SIGZI,GAMMA,A2,SUM)                         ISC23200
 1270 A2 = 2.0                                                          ISC23210
      A3 = (HM+HM-H+XBARUV)*SIGZI                                       ISC23220
      A5 = -.5*A3*A3                                                    ISC23230
      IF(A5 .GT. -50.) SUM1 = EXP(A5)                                   ISC23240
      IF(GAMMA .LE. 0.0) GOTO 1280                                      ISC23250
      A4 = (HM+HM+H-XBARUV)*SIGZI                                       ISC23260
      A5 = -.5*A4*A4                                                    ISC23270
      IF(A5 .GT. -50.) SUM1 = SUM1 + EXP(A5)*GAMMA                      ISC23280
      CALL VERT(H,HM,XBARUV,SIGZI,GAMMA,A2,SUM1)                        ISC23290
 1280 V = V + .5*PHI*(SUM+SUM1)                                         ISC23300
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 1290 CONTINUE                                                          ISC23310
C     CALCULATE CONCENTRATON FOR ALL SOURCE TYPES WITH VERTICAL TERM.   ISC23320
 1300 IF(ITYPE .EQ. 2) GOTO 1310                                        ISC23330
      CHI = QTK*UBARI*SIGYI*SIGZI*EXP(-A1)*V*DECAYT*.31830989           ISC23340
      GOTO 1390                                                         ISC23350
 1310 A3 = .70710678*SIGYI                                              ISC23360
      A4 = (XOP+YBAR)*A3                                                ISC23370
      A5 = -(XOP-YBAR)*A3                                               ISC23380
      A3 = ERFX(A4,A5)                                                  ISC23390
      CHI = QTK*XO*SIGZI*UBARI*V*DECAYT*A3*.39894228                    ISC23400
      GOTO 1390                                                         ISC23410
C     BEGIN DEPOSITION CALCULATIONS.                                    ISC23420
 1320 IF(NVS .GT. 0) GOTO 1330                                          ISC23430
      IF(LINE .EQ. 0) WRITE(IO,9011)                                    ISC23440
      WRITE(IO,9013) NSO                                                ISC23450
      STOP                                                              ISC23460
C     CALL SIGMAZ TO COMPUTE AVERAGE EFFECTIVE DOWNWIND DISTANCE, BBAR. ISC23470
1330  CONTINUE                                                          ISC23480
      IF(ISW(20) .NE. 3) CALL SIGMAZ(XBARZ,SIGZ,BBAR,ISTUM2,           ISC23490
     *    IXDIST,2,SASIGZ,SBSIGZ,DUMMY)                                ISC23500
      IF(ISW(20) .EQ. 3) CALL URBBAR(XBARZ,BBAR,ISTUM2,IXDIST,2,DUMMY)  ISC23510
      V = 0.0                                                           ISC23520
      DO 1370 K = 1,NVS                                                 ISC23530
      JP70 = K + 55                                                     ISC23540
      GAMMA = SOURCE(JP70,IS)                                           ISC23550
      JP70 = K + 15                                                     ISC23560
      PHI = SOURCE(JP70,IS)                                             ISC23570
      JP70 = K + 35                                                     ISC23580
      XBARUV = XBARU*SOURCE(JP70,IS)                                    ISC23590
      A5 = (1.-BBAR)*XBARUV                                             ISC23600
      GAM1 = 1.0                                                        ISC23610
      GAM2 = GAMMA                                                      ISC23620
      A2 = 0.0                                                          ISC23630
      SUM = 0.0                                                         ISC23640
 1340 SUML = SUM                                                        ISC23650
      A2 = A2 + 2.                                                      ISC23660
      HMA2 = A2*HM                                                      ISC23670
      A3 = (HMA2-H+XBARUV)*SIGZI                                        ISC23680
      A6 = 0.0                                                          ISC23690
      A3 = -.5*A3*A3                                                    ISC23700
      IF(A3 .GT. -50.) A6 = EXP(A3)*GAM1*(BBAR*(HMA2-H)-A5)             ISC23710
      IF(GAMMA .GT. 0.0) GOTO 1350                                      ISC23720
      SUM = A6                                                          ISC23730
      GOTO 1360                                                         ISC23740
 1350 A4 = (HMA2+H-XBARUV)*SIGZI                                        ISC23750
      A7 = 0.0                                                          ISC23760
      A4 = -.5*A4*A4                                                    ISC23770
      IF(A4 .GT. -50.) A7 = EXP(A4)*GAM2*(BBAR*(HMA2+H)+A5)             ISC23780
      SUM = SUM + A6 + A7                                               ISC23790
      IF(ABS(SUM-SUML) .LT. 1.E-8) GOTO 1360                            ISC23800
      GAM1 = GAM2                                                       ISC23810
      GAM2 = GAM2*GAMMA                                                 ISC23820
      GOTO 1340                                                         ISC23830
 1360 A3 = (H-XBARUV)*SIGZI                                             ISC23840
      A7 = -.5*A3*A3                                                    ISC23850
      A3 = 0.0                                                          ISC23860
      IF(A7 .GT. -50.) A3 = (BBAR*H + A5)*EXP(A7)                       ISC23870
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C     MODEL DOES NOT ALLOW FOR NEGATIVE DEPOSITION                      ISC23880
      VDUM=(1.-GAMMA)*PHI*(A3+SUM)                                      ISC23890
      IF(VDUM.LT.0.) VDUM=0.                                            ISC23900
      V=V+VDUM                                                          ISC23910
 1370 CONTINUE                                                          ISC23920
C     FINISH DEPOSITION CALCULATIONS.                                   ISC23930
      IF(ITYPE .EQ. 2) GOTO 1380                                        ISC23940
      CHI = QTK*SIGYI*SIGZI/XBAR*EXP(-A1)*DECAYT*V*.15915494            ISC23950
      GO TO 1390                                                        ISC23960
 1380 CHI = QTK*XO*SIGZI/XBAR*DECAYT*V*ERFX((XOP+YBAR)*SIGYI*.70710678  ISC23970
     1 ,-(XOP-YBAR)*SIGYI*.70710678)*.39894228                          ISC23980
C     STORE CONCENTRATION OR DEPOSITION INTO CALC ARRAY.  GO GET        ISC23990
C     NEXT RECEPTOR.                                                    ISC24000
 1390 CALC(IJ) = CHI                                                    ISC24010
      IJP = IJ + NPNTS                                                  ISC24020
      CALC(IJP) = CALC(IJP) + CHI                                       ISC24030
      GOTO 920                                                          ISC24040
 1400 CONTINUE                                                          ISC24050
      IF(NGROUP .EQ. 0) GOTO 1480                                       ISC24060
      NSUM = 0                                                          ISC24070
      DO 1470 IG = 1,NGROUP                                             ISC24080
      NS = NSOGRP(IG)                                                   ISC24090
      DO 1460 N = 1,NS                                                  ISC24100
      NNSO = IDSOR(NSUM+1)                                              ISC24110
      IF(NNSO .GT. 0) GOTO 1410                                         ISC24120
      NNSO = -NNSO                                                      ISC24130
      NNSO = IDSOR(NSUM) + 1                                            ISC24140
      IF(NSO .LT. NNSO .OR. NSO .GT. NNSO) GOTO 1460                    ISC24150
      GOTO 1420                                                         ISC24160
 1410 IF(NNSO .NE. NSO) GOTO 1460                                       ISC24170
C     LOAD THIS SOURCE CHI INTO APPROPRIATE CHIAV ARRAYS.               ISC24180
 1420 IAVG = 0                                                          ISC24190
      DO 1440 I = 1,8                                                   ISC24200
      IF(ISW(I+6) .NE. 1) GOTO 1440                                     ISC24210
      I1 = NPNTS*((IG-1)*NAVG + IAVG)                                   ISC24220
      IAVG = IAVG + 1                                                   ISC24230
      DO 1430 J = 1,NPNTS                                               ISC24240
      IP7 = I1 + J                                                      ISC24250
 1430 CHIAV(IP7) = CHIAV(IP7) + CALC(J)                                 ISC24260
 1440 CONTINUE                                                          ISC24270
      IF(ISW(15) .NE. 1) GOTO 1460                                      ISC24280
C     LOAD SOURCE CHI FOR ANNUAL TABLE FOR THIS SOURCE GROUP.           ISC24290
      I2 = (IG-1)*NPNTS                                                 ISC24300
      DO 1450 J = 1,NPNTS                                               ISC24310
      IP7 = I2 + J                                                      ISC24320
 1450 CHIAN(IP7) = CHIAN(IP7) + CALC(J)                                 ISC24330
 1460 NSUM = NSUM + 1                                                   ISC24340
 1470 CONTINUE                                                          ISC24350
C     GET NEXT SOURCE                                                   ISC24360
 1480 CONTINUE                                                          ISC24370
 1490 IF(NGROUP .GT. 0) GOTO 1520                                       ISC24380
C     LOAD ALL SOURCE CHI'S INTO APPROPRIATE CHIAV ARRAYS.              ISC24390
      IAVG = 0                                                          ISC24400
      DO 1510 I = 1,8                                                   ISC24410
      IF(ISW(I+6) .NE. 1) GOTO 1510                                     ISC24420
      IP6 = IAVG*NPNTS                                                  ISC24430
      IAVG = IAVG + 1                                                   ISC24440
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      DO 1500 J = 1,NPNTS                                                ISC24450
      I2 = IP6 + J                                                       ISC24460
      IP7 = NPNTS + J                                                    ISC24470
 1500 CHIAV(I2) = CHIAV(I2) + CALC(IP7)                                  ISC24480
 1510 CONTINUE                                                           ISC24490
C                                                                        ISC24500
C     BEGIN LOOP OVER ALL SOURCE GROUPS.                                 ISC24510
C                                                                        ISC24520
 1520 NSUM = 1                                                           ISC24530
      IG = 1                                                             ISC24540
      IF(NGROUP .LE. 0) GOTO 1540                                        ISC24550
 1530 NS = NSOGRP(IG)                                                    ISC24560
      ITO = NSUM + NS - 1                                                ISC24570
C                                                                        ISC24580
C     BEGIN LOOP OVER ALL TIME PERIODS FOR THIS HOUR.                    ISC24590
C                                                                        ISC24600
 1540 IAVG = 0                                                           ISC24610
      DO 1640  I = 1,8                                                   ISC24620
C     FOR DAILY TABLES COMPUTE AVERAGES, WRITE TO TAPE & PRINT.          ISC24630
      IF(ISW(I+6) .NE. 1) GOTO 1640                                      ISC24640
      IAVG = IAVG + 1                                                    ISC24650
      IF(.NOT.IFLAG(I)) GOTO 1640                                        ISC24660
C     SET CALM FLAGS                                                     ISC24670
      IF(ISW(27).EQ.1) THEN                                              ISC24680
      IFLAGC(I)=0                                                        ISC24690
      JCL=IHR-KAVG(I)+1                                                  ISC24700
      DO 1545 JC=JCL,IHR                                                 ISC24710
 1545 IF(NC(JC).EQ.1) IFLAGC(I)=1                                        ISC24720
      ENDIF                                                              ISC24730
      I1 = NPNTS*((IG-1)*NAVG + IAVG - 1)                                ISC24740
      IF(KAVG(I) .EQ. 1.OR. ISW(1) .EQ. 2) GOTO 1560                     ISC24750
      A1 = 1./KAVG(I)                                                    ISC24760
C     CALL SUBROUTINE TO DETERMINE A1 IF CALM OPTION IS USED             ISC24770
      IF(ISW(27) .EQ. 1 .AND. I .GT. 3) CALL AVCALM(I,IHR,A1)            ISC24780
      DO 1550 J = 1,NPNTS                                                ISC24790
      IP7 = I1 + J                                                       ISC24800
 1550 CHIAV(IP7) = CHIAV(IP7)*A1                                         ISC24810
 1560 IF(ISW(5) .EQ. 1) WRITE(ITAP) IHR,JDY,IG,(CHIAV(I1+J),J=1,NPNTS)   ISC24820
      IF(IPERD .GT. 0 .AND. IPERD .NE. IHR/KAVG(I)) GOTO 1570            ISC24830
      IF(ISW(16) .NE. 1) GOTO 1570                                       ISC24840
      IP7 = I1 + 1                                                       ISC24850
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,CHIAV(IP7),KAVG(I),JDY,IHR,1,     ISC24860
     1 NSUM,ITO,IG)                                                      ISC24870
C     CALCULATE HIGHEST & SECOND HIGHEST TABLES IF DESIRED.              ISC24880
 1570 IF(ISW(17) .EQ. 0) GOTO 1600                                       ISC24890
      NPNTS2 = NPNTS + NPNTS                                             ISC24900
      NPNTS3 = NPNTS2 + NPNTS                                            ISC24910
      IP4 = 4*I1                                                         ISC24920
      IF(ISW(17).GT.1) IP4=6*I1                                          ISC24930
C     512 = 2**9  SHIFT HOUR VALUE & STORE WITH DAY.                     ISC24940
      IHRTS = 512*IHR                                                    ISC24950
      DO 1590 J = 1,NPNTS                                                ISC24960
      JP4 = IP4 + J                                                      ISC24970
      JP5 = I1 + J                                                       ISC24980
      JP2 = JP4 + NPNTS2                                                 ISC24990
      JP3 = JP4 + NPNTS3                                                 ISC25000
      IF(ISW(17).LT.2) GO TO 1575                                        ISC25010
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      JP6=JP3+NPNTS                                                          ISC25020
      JP7=JP6+NPNTS                                                          ISC25030
C     FIRST MAXIMUM                                                          ISC25040
 1575 IF(CHIMAX(JP4) .GE. CHIAV(JP5)) GOTO 1580                              ISC25050
      JP1 = JP4 + NPNTS                                                      ISC25060
      IF(ISW(17).GT.1) CHIMAX(JP6)=CHIMAX(JP2)                               ISC25070
      CHIMAX(JP2) = CHIMAX(JP4)                                              ISC25080
      CHIMAX(JP4) = CHIAV(JP5)                                               ISC25090
      IF(ISW(17) .GT.1) CHIMAX(JP7)=CHIMAX(JP3)                              ISC25100
      CHIMAX(JP3) = CHIMAX(JP1)                                              ISC25110
      CHIMAX(JP1) = JDY + IHRTS                                              ISC25120
      IF(IFLAGC(I).EQ.1) CHIMAX(JP1)=CHIMAX(JP1)+1000000.                    ISC25130
      GOTO 1590                                                              ISC25140
C     SECOND MAXIMUM                                                         ISC25150
 1580 IF(CHIMAX(JP2) .GE. CHIAV(JP5)) GOTO 1585                              ISC25160
      IF(ISW(17).GT.1) CHIMAX(JP6)=CHIMAX(JP2)                               ISC25170
      CHIMAX(JP2) = CHIAV(JP5)                                               ISC25180
      IF(ISW(17).GT.1) CHIMAX(JP7)=CHIMAX(JP3)                               ISC25190
      CHIMAX(JP3) = JDY + IHRTS                                              ISC25200
      IF(IFLAGC(I).EQ.1) CHIMAX(JP3)=CHIMAX(JP3)+1000000.                    ISC25210
      GO TO 1590                                                             ISC25220
C     THIRD MAXIMUM                                                          ISC25230
 1585 IF(ISW(17).LT.2) GO TO 1590                                            ISC25240
       IF(CHIMAX(JP6).GE.CHIAV(JP5)) GO TO 1590                              ISC25250
      CHIMAX(JP6)=CHIAV(JP5)                                                 ISC25260
      CHIMAX(JP7)=JDY+IHRTS                                                  ISC25270
      IF(IFLAGC(I).EQ.1) CHIMAX(JP7)=CHIMAX(JP7)+1000000.                    ISC25280
 1590 CONTINUE                                                               ISC25290
C     CALCULATE 50 HIGHEST CONCENTRATIONS(DEPOSITIONS).                      ISC25300
 1600 IF(ISW(18) .NE. 1) GOTO 1610                                           ISC25310
      IP7 = (IG-1)*NAVG                                                      ISC25320
      IP6 = I1 + 1                                                           ISC25330
      IP7 = IP7 + IAVG                                                       ISC25340
C     FLAG CALM PERIODS                                                      ISC25350
      IF(IFLAGC(I).EQ.1) JDY=JDY+1000000                                     ISC25360
      CALL MAX50(CHIAV(IP6),CHI50(1,IP7),IPNT(1,IP7),ICOUNT(IP7),            ISC25370
     1  IHR,JDY)                                                            ISC25380
C     SET JDY BACK TO ACTUAL VALUE                                           ISC25390
      IF(IFLAGC(I).EQ.1) JDY=JDY-1000000                                     ISC25400
C     CLEAR 'CHIAV' ARRAY FOR THIS SOURCE GROUP & APPROPRIATE TIME           ISC25410
C     PERIOD.                                                                ISC25420
 1610 DO 1620 J = 1,NPNTS                                                    ISC25430
 1620 CHIAV(I1+J) = 0.0                                                      ISC25440
 1630 CONTINUE                                                               ISC25450
 1640 CONTINUE                                                               ISC25460
      IG = IG + 1                                                            ISC25470
      IF(IG .GT. NGROUP) GOTO 1650                                           ISC25480
      NSUM = NSUM + NS                                                       ISC25490
      GOTO 1530                                                              ISC25500
C     STORE ANNUAL AVERAGE.                                                  ISC25510
 1650 IF(ISW(15) .NE. 1 .OR. NGROUP .GT. 0) GOTO 1670                        ISC25520
      DO 1660 I = 1,NPNTS                                                    ISC25530
      IP6 = I + NPNTS                                                        ISC25540
 1660 CHIAN(I) = CHIAN(I) + CALC(IP6)                                        ISC25550
C     END HOURLY LOOP.                                                       ISC25560
 1670 CONTINUE                                                               ISC25570
      IF(NAVG.LE.0) GO TO 1685                                               ISC25580
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C     CLEAR DAILY AVERAGES ARRAY BEFORE GOING TO NEXT DAY.                ISC25590
      NPNTS2 = NAVG*NPNTS                                                 ISC25600
      IF(NGROUP .GT. 0) NPNTS2 = NPNTS2*NGROUP                            ISC25610
      DO 1680 I = 1,NPNTS2                                                ISC25620
 1680 CHIAV(I) = 0.0                                                      ISC25630
 1685 NTDAY = NTDAY + 1                                                   ISC25640
 1690 CONTINUE                                                            ISC25650
C     END OF MET DATA.                                                    ISC25660
      NDAYS = NTDAY                                                       ISC25670
      NSUM = 1                                                            ISC25680
      IG = 1                                                              ISC25690
      IF(NGROUP .LE. 0) GOTO 1710                                         ISC25700
 1700 NS = NSOGRP(IG)                                                     ISC25710
      ITO = NSUM + NS - 1                                                 ISC25720
C     PRINT 'N'-DAY TABLE                                                 ISC25730
 1710 IF(ISW(15) .NE. 1) GOTO 1730                                        ISC25740
      NHTOT = NTDAY*24                                                    ISC25750
      IF(ISW(19) .NE. 1) NHTOT = NDAYS*NHOURS                             ISC25760
C     ADJUST NHTOT IF USING CALM OPTION                                   ISC25770
      IF(ISW(27) .EQ. 1) NHTOT=NHTOT-NCMYR                                ISC25780
      HTOT = 1./FLOAT(NHTOT)                                              ISC25790
      IF(ISW(1) .EQ. 2) HTOT = 1.0                                        ISC25800
      I1 = (IG-1)*NPNTS + 1                                               ISC25810
      I2 = I1 + NPNTS - 1                                                 ISC25820
      DO 1720 I = I1,I2                                                   ISC25830
 1720 CHIAN(I) = CHIAN(I)*HTOT                                            ISC25840
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,CHIAN(I1),75,IDY,IHR,1,NSUM,ITO,   ISC25850
     1 IG)                                                                ISC25860
      IF(ISW(5) .EQ. 1) WRITE(ITAP) NHOURS,NTDAY,NGROUP,(CHIAN(I),        ISC25870
     1 I=I1,I2)                                                           ISC25880
C                                                                         ISC25890
C     BEGIN LOOP OVER TIME PERIODS.                                       ISC25900
 1730 IAVG = 0                                                            ISC25910
      DO 1750 I = 1,8                                                     ISC25920
      IF(ISW(I+6) .NE. 1) GOTO 1750                                       ISC25930
      IAVG = IAVG + 1                                                     ISC25940
C     PRINT HIGHEST & SECOND HIGHEST CONCENTRATION(DEPOSITION) TABLES.    ISC25950
      IF(ISW(17) .EQ. 0) GOTO 1740                                        ISC25960
      IDUM=4                                                              ISC25970
      IF(ISW(17).GT.1) IDUM=6                                             ISC25980
      IP6 = IDUM*NPNTS*((IG-1)*NAVG + IAVG - 1) + 1                       ISC25990
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,CHIMAX(IP6),KAVG(I),IDY,IHR,2,     ISC26000
     1 NSUM,ITO,IG)                                                       ISC26010
      IP6 = IP6 + NPNTS + NPNTS                                           ISC26020
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,CHIMAX(IP6),KAVG(I),IDY,IHR,3,     ISC26030
     1 NSUM,ITO,IG)                                                       ISC26040
      IF(ISW(17).LT.2) GO TO 1740                                         ISC26050
      IP6=IP6+NPNTS+NPNTS                                                 ISC26060
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,CHIMAX(IP6),KAVG(I),IDY,IHR,4,     ISC26070
     1 NSUM,ITO,IG)                                                       ISC26080
C     PRINT MAXIMUM 50                                                    ISC26090
 1740 IF(ISW(18) .NE. 1) GOTO 1750                                        ISC26100
      IP6 = (IG-1)*NAVG + IAVG                                            ISC26110
      CALL MAXOT(CHI50(1,IP6),GRIDX,GRIDY,XDIS,YDIS,IPNT(1,IP6),          ISC26120
     1 ICOUNT(IP6),KAVG(I),NSUM,ITO-IG)                                   ISC26130
 1750 CONTINUE                                                            ISC26140
      IG = IG + 1                                                         ISC26150
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      IF(IG .GT. NGROUP) GOTO 1760                                          ISC26160
      NSUM = NSUM + NS                                                      ISC26170
      GOTO 1700                                                             ISC26180
 1760 IF(ISW(5) .NE. 1) GOTO 1770                                           ISC26190
      ENDFILE ITAP                                                          ISC26200
      ENDFILE ITAP                                                          ISC26210
 1770 RETURN                                                                ISC26220
 9001 FORMAT(1H1,121X,9HMET. DATA/122X,3HDAY,I4)                            ISC26230
 9002 FORMAT(31X,69H* SOURCE-RECEPTOR COMBINATIONS LESS THAN 001 METERS     ISC26240
     1OR THREE BUILDING/34X,25HHEIGHTS IN DISTANCE.  NO ,6A4,               ISC26250
     2 16H IS CALCULATED *///46X,25H- - RECEPTOR LOCATION - -/51X,          ISC26260
     3  1HX,8X,10HY (METERS),10X,8HDISTANCE/31X,6HSOURCE,11X,              ISC26270
     4 23HOR RANGE   OR DIRECTION,9X,7HBETWEEN/31X,6HNUMBER,11X,           ISC26280
     5 21H(METERS)    (DEGREES),11X,8H(METERS)/30X,30(2H- )/)               ISC26290
 9003 FORMAT(31X,I5,8X,2F13.1,7X,F10.2)                                     ISC26300
 9004 FORMAT(I8,5F8.0,I8,2F8.0)                                             ISC26310
 9005 FORMAT(32X,4H*** ,15A4,4H ***//)                                      ISC26320
 9006 FORMAT(//68X,10HPOT. TEMP./29X,4HFLOW,7X,15HWIND      MIXING,13X,    ISC26330
     1 8HGRADIENT,17X,16HWIND       DECAY/28X,16HVECTOR     SPEED,5X,      ISC26340
     264HHEIGHT     TEMP.    (DEG. K    STABILITY   PROFILE   COEFFICIENISC26350
     3T/20X,92HHOUR   (DEGREES)   (MPS)    (METERS)  (DEG. K)  PER METERISC26360
     4)   CATEGORY   EXPONENT   (PER SEC)/19X,47(2H -)/)                    ISC26370
 9007 FORMAT(49X,29H* METEOROLOGICAL DATA FOR DAY,I4,2H *)                   ISC26380
 9008 FORMAT(21X,I2,F11.1,F10.2,F11.1,F9.1,F12.4,I9,F13.4,E15.6)            ISC26390
 9009 FORMAT(//47X,6HRANDOM/38X,2(4HFLOW,6X),16H WIND      MIXING,15X,      ISC26400
     1 19HINPUT       ADJUSTED/37X,2(6HVECTOR,4X),27H SPEED      HEIGHT     ISC26410
     2  TEMP.,2(3X,9HSTABILITY)/29X,6HHOUR   ,2(10H (DEGREES)),3X,          ISC26420
     3 30H(MPS)    (METERS)  (DEG. K)   ,2(8HCATEGORY,4X)/27X,40(2H -)/)   ISC26430
 9010 FORMAT(30X,I2,F11.1,F10.1,F10.2,F11.1,F9.1,I9,I12)                    ISC26440
 9011 FORMAT(1H1)                                                           ISC26450
 9012 FORMAT(10X,46H*** ERROR ***  PHYSICAL STACK HEIGHT OF SOURCE,I5/      ISC26460
     1 10X,52HIS LOWER THAN THE TERRAIN ELEVATION FOR THE RECEPTOR/10X,     ISC26470
     1 12HLOCATED AT (,F 9.1,1H,,F 9.1,19H).  RUN TERMINATED.)              ISC26480
 9013 FORMAT(10X,25H***ERROR*** SOURCE NUMBER,I6,41H HAS NO GRAVITATIONA    ISC26490
     1L SETTLING CATEGORIES,/10X,52HWITH WHICH TO CALCULATE DEPOSITION.     ISC26500
     2 RUN TERMINATED.)                                                     ISC26510
      END                                                                   ISC26520
      SUBROUTINE DYOUT(GRIDX,GRIDY,XDIS,YDIS,CON,IAVG,IDY,IHR,IFLAG,        ISC26530
     1 IFR,ITO,IG)                                                          ISC26540
C               SUBROUTINE DYOUT (VERSION 86170), PART OF ISCST.           ISC26550
C     THIS ROUTINE PRINTS THE DAILY CONCENTRATION (DEPOSITION) FOR A       ISC26560
C     GIVEN TIME PERIOD FOR A GIVEN DAY.  THIS ROUTINE ALSO PRINTS   S04   ISC26570
C     THE HIGHEST OR SECOND HIGHEST TABLES OF CONCENTRATION (DEPOSITION)   ISC26580
C     FOR A GIVEN AVERAGING TIME.  FINALLY, THIS ROUTINE PRINTS THE        ISC26590
C     'N'-DAY TABLE OR PRINTS THE ELEVATION HEIGHTS FOR ALL RECEPTOR       ISC26600
C     POINTS.                                                              ISC26610
C     IF IAVG = 99, PRINT ELEVATION HEIGHTS.                               ISC26620
C     IF IAVG = 75, PRINT 'N'-DAY TABLE.                                   ISC26630
C     IF IFLAG = 1, PRINT DAILY TABLE.                                     ISC26640
C     IF IFLAG = 2, PRINT HIGHEST TABLE.                                   ISC26650
C     IF IFLAG = 3, PRINT SECOND HIGHEST TABLE.                            ISC26660
C     IF IFLAG = 4, PRINT THIRD HIGHEST TABLE.                             ISC26670
      LOGICAL ONE                                                           ISC26680
      DIMENSION GRIDX(1),GRIDY(1),XDIS(1),YDIS(1),CON(1)                    ISC26690
      DIMENSION IDAY(5),IHOUR(5)                                            ISC26700
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,            ISC26710
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE,    ISC26720
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     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT                ISC26730
      CHARACTER*1 CFLAG(5)                                                    ISC26740
      CHARACTER*1 CALM                                                        ISC26750
      CHARACTER*1 NCALM                                                       ISC26760
C     DEFINE CALM PRINTING CHARACTERS                                         ISC26770
      DATA CALM/'C'/,NCALM/' '/                                               ISC26780
C     SET HOUR AVERAGE LABEL.                                                 ISC26790
      HOUR = 4HHOUR                                                           ISC26800
      IF(IAVG .GT. 1) HOUR = 4HPER.                                           ISC26810
   10 IF(NXPNTS .EQ. 0 .OR. NYPNTS .EQ. 0) GOTO 190                           ISC26820
C     INITIALIZE SUBSCRIPTS & SUBSCRIPT INCREMENTS.                           ISC26830
C     MAXIMUM OF 38 LINES OF Y-AXIS DUE TO HEADING.                           ISC26840
C     MAXIMUM OF 9 VALUES ACROSS FOR X-AXIS FOR DAILY & ANNUAL TABLES;        ISC26850
C     5 VALUES ACROSS FOR HIGHEST & SECOND HIGHEST TABLES.                    ISC26860
      IXINC = 9                                                               ISC26870
      IF(IFLAG .GT. 1) IXINC = 5                                              ISC26880
      IX = 1                                                                  ISC26890
      JX = IXINC                                                              ISC26900
      IY = NYPNTS - 38                                                        ISC26910
      JY = NYPNTS                                                             ISC26920
C     FIND MAXIMUM VALUE FOR RECEPTOR GRID ONLY.                              ISC26930
      IF(IAVG .EQ. 99) GOTO 30                                                ISC26940
      NN = NXPNTS*NYPNTS                                                      ISC26950
      CONMAX = 0.0                                                            ISC26960
      DO 20  J = 1,NYPNTS                                                     ISC26970
      L = (J-1)*NXPNTS                                                        ISC26980
      DO 20  I = 1,NXPNTS                                                     ISC26990
      K = L + I                                                               ISC27000
      IF(CON(K) .LT. CONMAX) GOTO 20                                          ISC27010
      CONMAX = CON(K)                                                         ISC27020
      IXP = I                                                                 ISC27030
      IYP = J                                                                 ISC27040
   20 CONTINUE                                                                ISC27050
      GOTO 40                                                                 ISC27060
   30 IF(IAVG .NE. 99) GOTO 40                                                ISC27070
      WRITE(IO,9001)                                                          ISC27080
      WRITE(IO,9010) TITLE                                                    ISC27090
      WRITE(IO,9011)                                                          ISC27100
      WRITE(IO,9009)                                                          ISC27110
      GOTO 100                                                                ISC27120
   40 IF(IAVG .NE. 75) GOTO 50                                                ISC27130
      WRITE(IO,9002) NTDAY                                                    ISC27140
      WRITE(IO,9003) IG                                                       ISC27150
      WRITE(IO,9010) TITLE                                                    ISC27160
      WRITE(IO,9012) NTDAY,CONDEP,ICHIUN                                      ISC27170
      GOTO 90                                                                 ISC27180
   50 IF(IFLAG.EQ.4) GO TO 65                                                 ISC27190
      IF(IFLAG-2) 60 ,70 ,60                                                  ISC27200
   60 I1 = IHR/IAVG                                                           ISC27210
      WRITE(IO,9004) IDY,IAVG,I1                                              ISC27220
      WRITE(IO,9003) IG                                                       ISC27230
      WRITE(IO,9010) TITLE                                                    ISC27240
      WRITE(IO,9013)  IAVG,CONDEP,ICHIUN,IHR,IDY                              ISC27250
      GOTO 90                                                                 ISC27260
   70 WRITE(IO,9005) IAVG                                                     ISC27270
      WRITE(IO,9003) IG                                                       ISC27280
      WRITE(IO,9010) TITLE                                                    ISC27290
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      WRITE(IO,9014)  IAVG,CONDEP,ICHIUN                                ISC27300
      GOTO 90                                                           ISC27310
   80 WRITE(IO,9006) IAVG                                               ISC27320
      WRITE(IO,9003) IG                                                 ISC27330
      WRITE(IO,9010) TITLE                                              ISC27340
      WRITE(IO,9015)  IAVG,CONDEP,ICHIUN                                ISC27350
      GO TO 90                                                          ISC27360
   85 WRITE (IO,9033) IAVG                                              ISC27370
      WRITE(IO,9033) IG                                                 ISC27380
      WRITE(IO,9010) TITLE                                              ISC27390
      WRITE(IO,9034) IAVG,CONDEP,ICHIUN                                 ISC27400
   90 IF(NGROUP .EQ. 0) WRITE(IO,9007)                                  ISC27410
      IF(NGROUP .GT. 0) WRITE(IO,9008) (IDSOR(I),I=IFR,ITO)             ISC27420
      WRITE(IO,9009)                                                    ISC27430
      WRITE(IO,9016) CONMAX,GRIDX(IXP),GRIDY(IYP)                       ISC27440
C     LABEL AXES DEPENDING ON GRID SYSTEM.                              ISC27450
  100 IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) GOTO 110                     ISC27460
      WRITE(IO,9017)                                                    ISC27470
      GOTO 120                                                          ISC27480
  110 WRITE(IO,9018)                                                    ISC27490
C     CHECK NUMBER ACROSS & DOWN THE PAGE.                              ISC27500
  120 IF(NXPNTS .LE. JX) JX = NXPNTS                                    ISC27510
      IF(IY .LT. 0) IY = 0                                              ISC27520
C     PRINT CONCENTRATIONS(DEPOSITIONS) DEPENDING ON TYPE OF TABLE.     ISC27530
      IF(IFLAG .GT. 1) GOTO 140                                         ISC27540
      IF(ISW(2) .EQ. 1 .OR. ISW(2) .EQ. 3) WRITE(IO,9019) (GRIDX(I),    ISC27550
     1 I=IX,JX)                                                         ISC27560
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) WRITE(IO,9020) (GRIDX(I),    ISC27570
     1 I=IX,JX)                                                         ISC27580
      WRITE(IO,9021)                                                    ISC27590
      LINE = JY                                                         ISC27600
  130 L = (LINE-1)*NXPNTS                                               ISC27610
      WRITE(IO,9022) GRIDY(LINE), (CON(L+I),I=IX,JX)                    ISC27620
      LINE = LINE - 1                                                   ISC27630
      IF(LINE .LE. IY) GOTO 170                                         ISC27640
      GOTO 130                                                          ISC27650
  140 IF(ISW(2) .EQ. 1 .OR. ISW(2) .EQ. 3) WRITE(IO,9023) (GRIDX(I),    ISC27660
     1 I=IX,JX)                                                         ISC27670
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) WRITE(IO,9024) (GRIDX(I),    ISC27680
     1 I=IX,JX)                                                         ISC27690
      WRITE(IO,9021)                                                    ISC27700
      I1 = JX-IX+1                                                      ISC27710
      LINE = JY                                                         ISC27720
  150 L = (LINE-1)*NXPNTS                                               ISC27730
      DO 160 J = 1,I1                                                   ISC27740
      I2 = L + NPNTS + IX + J - 1                                       ISC27750
      ICON = CON(I2)                                                    ISC27760
C     SET CALM FLAG FOR TABLES                                          ISC27770
      CFLAG(J)=NCALM                                                    ISC27780
      IF(ICON.GT.1000000.) THEN                                         ISC27790
      ICON=ICON-1000000.                                                ISC27800
      CFLAG(J)=CALM                                                     ISC27810
      ENDIF                                                             ISC27820
      IDAY(J) = ICON - (ICON/512)*512                                   ISC27830
C     37000 OCTAL = 15872 DECIMAL AND MASKS IN HOUR.                    ISC27840
  160 IHOUR(J) = ICON/(512*IAVG)                                        ISC27850
C     WRITE(IO,9025) GRIDY(LINE), (CON(L+IX+I-1),IDAY(I),IHOUR(I),      ISC27860
```

```
C    1 I=1,I1)                                                          ISC27870
     WRITE(IO,9025) GRIDY(LINE),(CON(L+IX+I-1),CFLAG(I),                ISC27880
    . 1  IDAY(I),IHOUR(I),I=1,I1)                                       ISC27890
     LINE = LINE - 1                                                    ISC27900
     IF(LINE .GT. IY) GOTO 150                                          ISC27910
C    CHECK FOR MULTIPLE PAGE TABLES.                                    ISC27920
  170 IF(IY .LE. 0) GOTO 180                                            ISC27930
     IY = IY - 38                                                       ISC27940
     JY = JY - 38                                                       ISC27950
     GOTO 30                                                            ISC27960
  180 IF(NXPNTS .LE. JX) GOTO 190                                       ISC27970
     IX = IX + IXINC                                                    ISC27980
     JX = JX + IXINC                                                    ISC27990
     IY = NYPNTS - 38                                                   ISC28000
     JY = NYPNTS                                                        ISC28010
     GOTO 30                                                            ISC28020
  190 IF(NXWYPT .EQ. 0) GOTO 330                                        ISC28030
C    PRINT TABLES FOR DISCRETE POINTS.                                  ISC28040
     NN = NXPNTS*NYPNTS                                                 ISC28050
C    SET SUBSCRIPT VALUES & SUBSCRIPT INCREMENTS.                       ISC28060
     IXINC = 114                                                        ISC28070
     IF(IFLAG .GT. 1) IXINC = 76                                        ISC28080
     IX = 1                                                             ISC28090
     JX = IXINC                                                         ISC28100
     ONE = .FALSE.                                                      ISC28110
  200 IF(NXWYPT .GT. JX) GOTO 210                                       ISC28120
     JX = NXWYPT                                                        ISC28130
     IF((JX/2)*2 .NE. JX) ONE = .TRUE.                                  ISC28140
  210 IF(IAVG .NE. 99) GOTO 220                                         ISC28150
     WRITE(IO,9001)                                                     ISC28160
     WRITE(IO,9010) TITLE                                               ISC28170
     WRITE(IO,9011)                                                     ISC28180
     GOTO 280                                                           ISC28190
  220 IF(IAVG .NE. 75) GOTO 230                                         ISC28200
     WRITE(IO,9002) NTDAY                                               ISC28210
     WRITE(IO,9003) IG                                                  ISC28220
     WRITE(IO,9010) TITLE                                               ISC28230
     WRITE(IO,9012) NTDAY,CONDEP,ICHIUN                                 ISC28240
     GOTO 270                                                           ISC28250
  230 IF(IFLAG.EQ.4) GO TO 265                                          ISC28260
     IF(IFLAG-2) 240,250,260                                            ISC28270
  240 I1 = IHR/IAVG                                                     ISC28280
     WRITE(IO,9004) IDY,IAVG,I1                                         ISC28290
     WRITE(IO,9003) IG                                                  ISC28300
     WRITE(IO,9010) TITLE                                               ISC28310
     WRITE(IO,9013) IAVG,CONDEP,ICHIUN,IHR,IDY                          ISC28320
     GO TO 270                                                          ISC28330
  250 WRITE(IO,9005) IAVG                                               ISC28340
     WRITE(IO,9003) IG                                                  ISC28350
     WRITE(IO,9010) TITLE                                               ISC28360
     WRITE(IO,9014) IAVG,CONDEP,ICHIUN                                  ISC28370
     GOTO 270                                                           ISC28380
  260 WRITE(IO,9006) IAVG                                               ISC28390
     WRITE(IO,9003) IG                                                  ISC28400
     WRITE(IO,9010) TITLE                                               ISC28410
     WRITE(IO,9015) IAVG,CONDEP,ICHIUN                                  ISC28420
      GO TO 270                                                         ISC28430
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  265 WRITE(IO,9033) IAVG                                                    ISC28440
      WRITE(IO,9003) IG                                                      ISC28450
       WRITE(IO,9010) TITLE                                                  ISC28460
      WRITE(IO,9034) IAVG,CONDEP,ICHIUN                                      ISC28470
  270 IF(NGROUP .EQ. 0) WRITE(IO,9007)                                       ISC28480
      IF(NGROUP .GT. 0) WRITE(IO,9008) (IDSOR(I),I=IFR,ITO)                  ISC28490
  280 WRITE(IO,9026)                                                         ISC28500
      IF(IFLAG .GT. 1) GOTO 290                                              ISC28510
      IF(ISW(3) .EQ. 1 .OR. ISW(3) .EQ. 3) WRITE(IO,9027) (CONDEP(3),        ISC28520
     1 I=1,3)                                                                ISC28530
      IF(ISW(3) .EQ. 2 .OR. ISW(3) .EQ. 4) WRITE(IO,9028) (CONDEP(3),        ISC28540
     1 I=1,3)                                                                ISC28550
      WRITE(IO,9029) (XDIS(I),YDIS(I),CON(I+NN),I=IX,JX)                     ISC28560
      GOTO 320                                                               ISC28570
  290 IF(ISW(3) .EQ. 1 .OR. ISW(3) .EQ. 3) WRITE(IO,9030) (CONDEP(3),        ISC28580
     1 HOUR,I=1,2)                                                           ISC28590
      IF(ISW(3) .EQ. 2 .OR. ISW(3) .EQ. 4) WRITE(IO,9031) (CONDEP(3),        ISC28600
     1 HOUR,I=1,2)                                                           ISC28610
      NN1 = NN + NPNTS                                                       ISC28620
      DO 310 J = IX,JX,2                                                     ISC28630
      ICON = CON(NN1+J)                                                      ISC28640
C     CALM FLAGS FOR DISCRETE RECEPTORS                                      ISC28650
      CFLAG(1)=NCALM                                                         ISC28660
      IF(ICON.GT.1000000.) THEN                                              ISC28670
      ICON=ICON-1000000.                                                     ISC28680
      CFLAG(1)=CALM                                                          ISC28690
      ENDIF                                                                  ISC28700
      IDAY(1) = ICON - (ICON/512)*512                                        ISC28710
      IHOUR(1) = ICON/(512*IAVG)                                             ISC28720
      IF(J .EQ. JX .AND. ONE) GOTO 300                                       ISC28730
      ICON = CON(NN1+J+1)                                                    ISC28740
C     CALM FLAGS FOR DISCRETE RECEPTORS                                      ISC28750
      CFLAG(2)=NCALM                                                         ISC28760
      IF(ICON.GT.1000000.) THEN                                              ISC28770
      ICON=ICON-1000000.                                                     ISC28780
      CFLAG(2)=CALM                                                          ISC28790
      ENDIF                                                                  ISC28800
      IDAY(2) = ICON - (ICON/512)*512                                        ISC28810
      IHOUR(2) = ICON/(512*IAVG)                                             ISC28820
      I1 = J + 1                                                             ISC28830
      WRITE(IO,9032) XDIS(J),YDIS(J),CON(NN+J),CFLAG(1),IDAY(1),IHOUR(1)     ISC28840
     1 ,XDIS(I1),YDIS(I1),CON(NN+I1),CFLAG(2),IDAY(2),IHOUR(2)               ISC28850
      GOTO 310                                                               ISC28860
  300 WRITE(IO,9032) XDIS(J),YDIS(J),CON(NN+J),CFLAG(1),IDAY(1),IHOUR(1)     ISC28870
  310 CONTINUE                                                               ISC28880
C     CHECK FOR MULTIPLE PAGE OUTPUT.                                        ISC28890
  320 IF(NXWYPT .LE. JX) GOTO 330                                            ISC28900
      IX = JX + 1                                                            ISC28910
      JX = JX + IXINC                                                        ISC28920
      GOTO 200                                                               ISC28930
  330 LINE = 0                                                               ISC28940
      RETURN                                                                 ISC28950
 9001 FORMAT(1H1//)                                                          ISC28960
 9002 FORMAT(1H1,121X,7H'N'-DAY/122X,I3,5H DAYS)                             ISC28970
 9003 FORMAT(122X,7HSGROUP=,I3)                                              ISC28980
 9004 FORMAT(1H1,121X,7HDAILY: ,I3/122X,I2,6H-HR/PD,I2)                      ISC28990
 9005 FORMAT(1H1,121X,4HHIGH/122X,I2,3H-HR)                                  ISC29000
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 9006 FORMAT(1H1,121X,8H2ND HIGH/122X,I2,3H-HR)                                  ISC29010
 9007 FORMAT(56X,20H* FROM ALL SOURCES *)                                        ISC29020
 9008 FORMAT(50X,18H* FROM SOURCES:    ,5(I6,1H,),1H*/5(50X,10(I6,1H,)/))ISC29030
 9009 FORMAT(53X,25H* FOR THE RECEPTOR GRID *)                                   ISC29040
 9010 FORMAT(32X,4H***  ,15A4,4H  ***//)                                         ISC29050
 9011 FORMAT(/50X,31H* ELEVATION HEIGHTS IN METERS *)                            ISC29060
 9012 FORMAT(35X,2H*  ,I3,5H-DAY ,5A4,A2,7A4,2H *)                              ISC29070
 9013 FORMAT(32X,7H* DAILY,I3,6H-HOUR ,5A4,A2,7A4,2H */49X,                     ISC29080
     1 18H* ENDING WITH HOUR,I3, 8H FOR DAY,I4,2H *)                             ISC29090
 9014 FORMAT(31X,9H* HIGHEST,I3,6H-HOUR ,5A4 A2,7A4,2H *)                        ISC29100
 9015 FORMAT(27X,16H* SECOND HIGHEST,I3,6H-HOUR ,5A4,A2,7A4,2H *)                ISC29110
 9016 FORMAT(28X,22H* MAXIMUM VALUE EQUALS,F13.5,18H AND OCCURRED AT (,          ISC29120
     1 F10.1,1H,,F10.1,3H) *)                                                    ISC29130
 9017 FORMAT(13H   Y-AXIS   /,52X,15HX-AXIS (METERS))                           ISC29140
 9018 FORMAT(13H  DIRECTION /,52X,14HRANGE (METERS))                            ISC29150
 9019 FORMAT(13H  (METERS)  /,9F13.1)                                           ISC29160
 9020 FORMAT(13H  (DEGREES) /,9F13.1)                                           ISC29170
 9021 FORMAT(64(2H -)/)                                                         ISC29180
 9022 FORMAT(F11.1,2H /,9F13.5)                                                 ISC29190
 9023 FORMAT(13H  (METERS)  /,6X,5(F13.1,9X))                                   ISC29200
 9024 FORMAT(13H  (DEGREES) /,6X,5(F13.1,9X))                                   ISC29210
 9025 FORMAT(F11.1,2H /,5(F13.5,A1,1H(,I3,1H,,I2,1H)))                          ISC29220
 9026 FORMAT(48X,36H* FOR THE DISCRETE RECEPTOR POINTS *)                       ISC29230
 9027 FORMAT(2X,3(18H  - X -       - Y -,9X,A3,1H.,11X)/64(2H -)/)              ISC29240
 9028 FORMAT(2X,3(20H - RNG -      - DIR -,5X,A3,1H.,13X)/64(2H -)/)            ISC29250
 9029 FORMAT(3(2F11.1,F14.5,6X))                                                ISC29260
 9030 FORMAT(13X,2(19H  - X -       - Y - ,7X,A3,7H.      (,4HDAY,,A4,1H),ISC29270
     1 11X)/64(2H -)/)                                                          ISC29280
 9031 FORMAT(13X,2(3X,19H- RNG -      - DIR -,5X,A3,7H.      (,4HDAY,,A4,  ISC29290
     1 1H),10X)/64(2H -)/)                                                      ISC29300
 9032 FORMAT(12X,2(2F11.1,F13.5,A1,2H (,I3,1H,,I2,2H) ,10X))                    ISC29310
 9033 FORMAT(1H1,121X,8H3RD HIGH/122X, I2,3H-HR)                                ISC29320
 9034 FORMAT(28X,15H* THIRD HIGHEST,I3,6H-HOUR ,5A4,A2,7A4,2H *)                ISC29330
      END                                                                       ISC29340
C                                                                               ISC29350
      SUBROUTINE MAXOT(CON,GRIDX,GRIDY,XDIS,YDIS,IPNT,N,IAVG,IFR,ITO,IG)ISC29360
C               SUBROUTINE MAXOT (VERSION 86170), PART OF ISCST.                ISC29370
C     THIS ROUTINE LISTS THE HIGHEST 50 CONCENTRATIONS (DEPOSITIONS)            ISC29380
C     FOR A GIVEN TIME PERIOD.                                                  ISC29390
C                                                                               ISC29400
      DIMENSION CON(1),GRIDX(1),GRIDY(1),XDIS(1),YDIS(1),IPNT(1),N(1)           ISC29410
      DIMENSION IHR(2),IDY(2),X(2),Y(2),IR(2),CHI(2)                            ISC29420
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,                ISC29430
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE,         ISC29440
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6)                              ISC29450
      CHARACTER*1 CFLAG(2)                                                      ISC29460
      CHARACTER*1 CALM                                                          ISC29470
      CHARACTER*1 NCALM                                                         ISC29480
C     SET CALM PRINT CHARACTERS                                                 ISC29490
      DATA CALM/'C'/,NCALM/' '/                                                 ISC29500
C                                                                               ISC29510
      WRITE(IO,9001) IAVG,IG                                                    ISC29520
      WRITE(IO,9004) TITLE                                                      ISC29530
      WRITE(IO,9005) IAVG,CONDEP , ICHIUN                                       ISC29540
      IF(NGROUP .EQ. 0) WRITE(IO,9002)                                          ISC29550
      IF(NGROUP .GT. 0) WRITE(IO,9003) (IDSOR(I),I=IFR,ITO)                     ISC29560
      HOUR = 4HPER.                                                             ISC29570
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      IF(IAVG .EQ. 1) HOUR = 4HHOUR                                      ISC29580
      WRITE(IO,9006) (CONDEP(3),HOUR,I=1,2)                              ISC29590
      N1 = 1                                                             ISC29600
      N1 = N(N1)                                                         ISC29610
      I2 = (N1+1)/2                                                      ISC29620
      NN = NXPNTS*NYPNTS                                                 ISC29630
      DO 30 I = 1,I2                                                     ISC29640
      DO 20 J = 1,2                                                      ISC29650
      I1 = I + I2*(J-1)                                                  ISC29660
      IF(I1 .GT. N1) GOTO 40                                             ISC29670
      IP = IPNT(I1)                                                      ISC29680
      IR(J) = I1                                                         ISC29690
C     CHI(J) = CON(IP)                                                   ISC29700
C     OBTAIN HOUR & DAY.                                                 ISC29710
      IDY(J) = CON(IP+100)                                               ISC29720
C     SET CALM FLAG FOR TABLE                                            ISC29730
      CFLAG(J)=NCALM                                                     ISC29740
      IF(IDY(J).GT.1000000) THEN                                         ISC29750
      IDY(J)=IDY(J)-1000000                                              ISC29760
      CFLAG(J)=CALM                                                      ISC29770
      ENDIF                                                              ISC29780
      IHR(J) = IDY(J)/(512*IAVG)                                         ISC29790
      IDY(J) = IDY(J) - (IDY(J)/512)*512                                 ISC29800
      K=CON(IP+50)                                                       ISC29810
C     GET X,Y LOCATION OF RECEPTOR.                                      ISC29820
      IF(K .GT. NN) GOTO 10                                              ISC29830
      IY = (K-1)/NXPNTS+1                                                ISC29840
      IX = K - (IY-1)*NXPNTS                                             ISC29850
      X(J) = GRIDX(IX)                                                   ISC29860
      Y(J) = GRIDY(IY)                                                   ISC29870
      GOTO 20                                                            ISC29880
   10 K = K - NN                                                         ISC29890
      X(J) = XDIS(K)                                                     ISC29900
      Y(J) = YDIS(K)                                                     ISC29910
   20 CONTINUE                                                           ISC29920
   30 WRITE(IO,9007) (IR(J),CHI(J),CFLAG(J),IHR(J),                      ISC29930
     X  IDY(J),X(J),Y(J),J=1,2)                                          ISC29940
      RETURN                                                             ISC29950
   40 WRITE(IO,9007)  IR(1),CHI(1),CFLAG(1),IHR(1),IDY(1),X(1),Y(1)      ISC29960
      RETURN                                                             ISC29970
 9001 FORMAT(1H1,121X,6HMAX 50/122X,I2,3H-HR/122X,7HSGROUP8,I3)          ISC29980
 9002 FORMAT(56X,20H* FROM ALL SOURCES *)                                ISC29990
 9003 FORMAT(50X,18H* FROM SOURCES:    ,5(I6,1H,),1H*/5(50X,10(I6,1H,)/))ISC30000
 9004 FORMAT(32X,4H*** ,15A4,4H ***//)                                   ISC30010
 9005 FORMAT(28X,12H* 50 MAXIMUM,I3,6H-HOUR ,5A4,A2,7A4,2H *//)          ISC30020
 9006 FORMAT(//2(44X,1HX,6X,9HY(METERS))/2(44X,2HOR,8X,2HOR,4X)/         ISC30030
     3 2(43X,17HRANGE   DIRECTION)/                                      ISC30040
     1 2(10X,4HRANK,6X,A3,1H.,6X,A4,26H DAY   (METERS)  (DEGREES))/      ISC30050
     2 5X,60(2H- )/)                                                     ISC30060
 9007 FORMAT(2(10X,I3,F15.5,A1,I4,I5,2F11.1))                            ISC30070
C     END                                                                ISC30080
C                                                                        ISC30090
C     SUBROUTINE MAX50(CON,CON50,IPNT,ICOUNT,IHR,IDY)                    ISC30100
C                SUBROUTINE MAX50 (VERSION 86170), PART OF ISCST.        ISC30110
C     THIS ROUTINE HOLDS THE HIGHEST 50 CONCENTRATIONS (DEPOSITIONS).    ISC30120
C     FOR A GIVEN TIME PERIOD.                                           ISC30130
                                                                         ISC30140
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      DIMENSION CON(1),CONSO(1),IPNT(1),ICOUNT(1)                       ISC30150
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,        ISC30160
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE, ISC30170
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT          ISC30180
C     SET MAXIMUM NUMBER OF ENTRIES IN TABLE.                           ISC30190
      MAX = 50                                                          ISC30200
      LL = 1                                                            ISC30210
      DO 90  K = 1,NPNTS                                                ISC30220
      IF(ICOUNT(LL) .LT. MAX) GOTO 10                                   ISC30230
C     CHECK IF VALUE IS LESS THAN LOWEST IN MAXIMUM 50 TABLE.           ISC30240
      IP = IPNT(MAX)                                                    ISC30250
      IF(CON(K) .LE. CONSO(IP)) GOTO 90                                 ISC30260
      GOTO 20                                                           ISC30270
   10 IF(ICOUNT(LL) .NE. 0) GOTO 20                                     ISC30280
      IICNT = 1                                                         ISC30290
      GOTO 80                                                           ISC30300
   20 I = 1                                                             ISC30310
   30 IP = IPNT(I)                                                      ISC30320
      IF(CON(K) .GE. CONSO(IP)) GOTO 40                                 ISC30330
      I = I + 1                                                         ISC30340
      IF(I .LE. ICOUNT(LL)) GOTO 30                                     ISC30350
C     VALUE IS LESS THAN ALL VALUES IN MAXIMUM 50 TABLE.                ISC30360
C     COUNTER, ICOUNT, IS ALWAYS LESS THAN 50 HERE.                     ISC30370
      IICNT = ICOUNT(LL) + 1                                            ISC30380
      GOTO 80                                                           ISC30390
   40 IICNT = ICOUNT(LL) + 1                                            ISC30400
      IF(ICOUNT(LL) .NE. MAX) GOTO 50                                   ISC30410
      IP = IPNT(MAX)                                                    ISC30420
      IICNT = MAX                                                       ISC30430
   50 ISTOP = I + 1                                                     ISC30440
      IF(ISTOP .GT. IICNT) GOTO 70                                      ISC30450
C     SHIFT POINTERS.                                                   ISC30460
      II = IICNT                                                        ISC30470
   60 IPNT(II) = IPNT(II-1)                                             ISC30480
      II = II - 1                                                       ISC30490
      IF(II .GE. ISTOP) GOTO 60                                         ISC30500
   70 IF(ICOUNT(LL) .EQ. MAX) IICNT = IP                                ISC30510
      IPNT(I) = IICNT                                                   ISC30520
C     STORE NEW VALUES INTO MAXIMUM 50 TABLE.                           ISC30530
   80 CONSO(IICNT) = CON(K)                                             ISC30540
      CONSO(IICNT+MAX) = K                                              ISC30550
C     2**9 = 512 & SHIFTS HOUR 9 BITS.                                  ISC30560
      I1 = IDY + 512*IHR                                                ISC30570
      CONSO(IICNT+MAX+MAX) = I1                                         ISC30580
      IF(ICOUNT(LL) .LT. MAX) ICOUNT(LL) = ICOUNT(LL) + 1               ISC30590
   90 CONTINUE                                                          ISC30600
      RETURN                                                            ISC30610
      END                                                               ISC30620
C                                                                       ISC30630
      SUBROUTINE VERT(H,HM,XB,SIGZI,GAM,A2,RESULT)                      ISC30640
C                  SUBROUTINE VERT (VERSION 86170), PART OF ISCST.      ISC30650
C     THIS ROUTINE COMPILES THE SUMMATION TERM IN THE VERTICAL TERM FOR  ISC30660
C     GRAVITATIONAL SETTLING CATEGORIES.                                ISC30670
C                                                                       ISC30680
      SUM = 0.0                                                         ISC30690
      GAM1 = GAM                                                        ISC30700
      GAM2 = GAM*GAM                                                    ISC30710
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   10 A5 = 0.0                                                          ISC30720
      A6 = 0.0                                                          ISC30730
      A2 = A2 + 2.                                                      ISC30740
      SUML = SUM                                                        ISC30750
      HI1A2 = HI1*A2                                                    ISC30760
      A3 = (HI1A2 - H + XB)*SIGZI                                       ISC30770
      A3 = -.5*A3*A3                                                    ISC30780
      IF(A3 .GT. -50.) A5 = EXP(A3)*GAM1                                ISC30790
      A4 = (HI1A2 + H - XB)*SIGZI                                       ISC30800
      A4 = -.5*A4*A4                                                    ISC30810
      IF(A4 .GT. -50.) A6 = EXP(A4)*GAM2                                ISC30820
      SUM = SUM + A5 + A6                                               ISC30830
      IF(ABS(SUM-SUML) .LT. 1.E-8) GOTO 20                              ISC30840
      GAM1 = GAM2                                                       ISC30850
      GAM2 = GAM2*GAM                                                   ISC30860
      GOTO 10                                                           ISC30870
   20 RESULT = RESULT + SUM                                             ISC30880
      IF(RESULT.LT.0.0) RESULT=0.0                                      ISC30890
      RETURN                                                            ISC30900
      END                                                               ISC30910
C                                                                       ISC30920
      SUBROUTINE SIGMAZ(XB,SZ,BB,IST,IXDIST,IFLAG,A,B,XZ)               ISC30930
C                  SUBROUTINE SIGMAZ (VERSION 86170), PART OF ISCST.    ISC30940
C     THIS ROUTINE CALCULATES THE VERTICAL SIGMA GIVEN THE EFFECTIVE     ISC30950
C     DOWNWIND DISTANCE XB IN KILOMETERS AND STABILITY CATEGORY IST.     ISC30960
C     IF IFLAG = 1, CALCULATE SIGMA Z.                                  ISC30970
C     IF IFLAG = 2, CALCULATE AVERAGE 'B' ONLY.                         ISC30980
C     IF IFLAG = 3, CALCULATE EFFECTIVE DOWNWIND DISTANCE INDEX IXDIST  ISC30990
C                   AS A FUNCTION OF XB, XZ AND STABILITY.              ISC31000
C                                                                       ISC31010
      DIMENSION A(1),B(1),XZ(1),X1(10,6),INDSGZ(6)                      ISC31020
C                                                                       ISC31030
C     ADJUST INDSGZ VALUES TO ALLOW FOR SOURCE-RECEPTOR                 ISC31040
C     DISTANCES OF LESS THAN 100M.                                      ISC31050
      DATA INDSGZ /0,9,12,13,19,28/                                     ISC31060
      DATA X1 /.1,.15,.2,.25,.3,.4,.5,3.11,1.E20,0.,  .2,.4,1.E20,7*0., ISC31070
     1 1.E20,9*0.,  .3,1.,3.,10.,30.,1.E20,4*0.,  .1,.3,1.,2.,4.,10.,   ISC31080
     2 20.,40.,1.E20,0.,  .2,.7,1.,2.,3.,7.,15.,30.,60.,1.E20/          ISC31090
C                                                                       ISC31100
      GOTO (80,90,10,10) , IFLAG                                        ISC31110
C                                                                       ISC31120
C     NOTE THAT STABILITY CATEGORY C HAS ONLY 1 DISTANCE CATEGORY.      ISC31130
   10 IF(IST .NE. 3) GOTO 20                                            ISC31140
      IXDIST = 13                                                       ISC31150
      RETURN                                                            ISC31160
   20 X = XB                                                            ISC31170
      I = 1                                                             ISC31180
      II = 0                                                            ISC31190
   30 IF(X-X1(I,IST) .LE. 0.0) GOTO 40                                  ISC31200
      I = I + 1                                                         ISC31210
      GOTO 30                                                           ISC31220
   40 IF(I-II) 50,60,70                                                 ISC31230
   50 IXDIST = IXDIST - 1                                               ISC31240
   60 RETURN                                                            ISC31250
   70 II = I                                                            ISC31260
      IXDIST = INDSGZ(IST) + I                                          ISC31270
      IF(IFLAG .GT. 3) RETURN                                           ISC31280
```

```
      X = XB + XZ(IXDIST)                                                ISC31290
      GOTO 30                                                            ISC31300
C     CALCULATE VERTICAL SIGMA.                                          ISC31310
   60 SZ = A(IXDIST)*XB**B(IXDIST)                                       ISC31320
      RETURN                                                             ISC31330
C     CALCULATE AVERAGE 'B'.                                             ISC31340
   90 BB = 0.0                                                           ISC31350
      I = IXDIST - INDSGZ(IST)                                           ISC31360
      DO 100 J = 1,I                                                     ISC31370
      I1 = INDSGZ(IST) + J                                               ISC31380
  100 BB = BB + B(I1)                                                    ISC31390
      BB = BB/FLOAT(I)                                                   ISC31400
      RETURN                                                             ISC31410
      END                                                                ISC31420
C                                                                        ISC31430
      FUNCTION ERFX(A,B)                                                 ISC31440
C                     FUNCTION ERFX (VERSION 86170), PART OF ISCST.      ISC31450
C     CALCULATE ERF(A) - ERF(B).                                         ISC31460
C     HPL = LOWER LIMIT     -    HPU = UPPER LIMIT.                      ISC31470
C                                                                        ISC31480
      LOGICAL DONE                                                       ISC31490
      DATA HPL,HPU /1.E-10,10./                                          ISC31500
      ERF(X) = 1+X*(.705230784E-1+X*(.422820123E-1+X*(.92705272E-2+      ISC31510
     1         X*(.1520143E-3+X*(.2765672E-3+X*.430638E-4)))))           ISC31520
C                                                                        ISC31530
      DONE = .FALSE.                                                     ISC31540
      C = A                                                              ISC31550
   10 C = ABS(C)                                                         ISC31560
      IF(C .GT. HPL) GOTO 20                                             ISC31570
      F = 1.                                                             ISC31580
      GOTO 40                                                            ISC31590
   20 IF(C .LT. HPU) GOTO 30                                             ISC31600
      F = 0.0                                                            ISC31610
      GOTO 40                                                            ISC31620
   30 F = ERF(C)                                                         ISC31630
      F = (1./F)**16                                                     ISC31640
   40 IF(DONE) GOTO 50                                                   ISC31650
      C = B                                                              ISC31660
      G = F                                                              ISC31670
      DONE = .TRUE.                                                      ISC31680
      GOTO 10                                                            ISC31690
   50 CONTINUE                                                           ISC31700
      IF(A .GE. 0.0) GOTO 70                                             ISC31710
      IF(B .LT. 0.0) GOTO 60                                             ISC31720
      ERFX = F + G - 2.0                                                 ISC31730
      RETURN                                                             ISC31740
   60 ERFX = G - F                                                       ISC31750
      RETURN                                                             ISC31760
   70 IF(B .LT. 0.0) GOTO 80                                             ISC31770
      ERFX = F - G                                                       ISC31780
      RETURN                                                             ISC31790
   80 ERFX = 2.0 - (F + G)                                               ISC31800
      RETURN                                                             ISC31810
      END                                                                ISC31820
C                                                                        ISC31830
      BLOCK DATA                                                         ISC31840
C                     BLOCK DATA (VERSION 86170), PART OF ISCST.         ISC31850
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C     SET DEFAULT VALUES.                                                    ISC31860
C                                                                            ISC31870
      INTEGER TITLE                                                          ISC31880
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,             ISC31890
     1 NSOGRP(150),IDSCR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE,      ISC31900
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT               ISC31910
C                                                                            ISC31920
      COMMON /MET/ IDAY(366),ISTAB(24),AWS(24),TEMP(24),AFV(24),             ISC31930
     1 AFVR(24),HLH(24,2),P(24),DTHDZ(24),DECAY(24),PDEF(6,6),               ISC31940
     2 DTHDEF(6,6),ZR,ODECAY,IMET,ITAP,TK,UCATS(5)                           ISC31950
C                                                                            ISC31960
C     INITIALIZE WIND PROFILE EXPONENTS AND VERTICAL POTENTIAL               ISC31970
C     TEMPERATURE GRADIENTS.                                                 ISC31980
C     DEFAULT VALUES FOR PDEF IN SUBROUTINE INCHK                            ISC31990
      DATA DTHDEF /24*0.0,6*.02,6*.035/                                      ISC32000
C                                                                            ISC32010
      END                                                                    ISC32020
      SUBROUTINE URBNYZ (X,KST,SY,SZ)                                        ISC32030
C** SUBROUTINE URBNYZ (VERSION 86170) PART OF ISCST                          ISC32040
C     BRIGGS URBAN PARAMETERS SIGMA-Y,SIGMA-Z                                ISC32050
C     SIGMA-Y,Z (IN METERS) FROM PASQUILL STABILITY CLASS (KST)              ISC32060
C     AND DISTANCE FROM SOURCE, XM, IN METERS.                               ISC32070
      XM=X*1000.                                                             ISC32080
      GO TO (20,20,30,40,50,50), KST                                         ISC32090
20    SY=0.32*XM/SQRT(1.+0.0004*XM)                                          ISC32100
      SZ=0.24*XM*SQRT(1.+0.001*XM)                                           ISC32110
      GO TO 60                                                               ISC32120
30    SY=0.22*XM/SQRT(1.+0.0004*XM)                                          ISC32130
      SZ=0.2*XM                                                              ISC32140
      GO TO 60                                                               ISC32150
40    SY=0.16*XM/SQRT(1.+0.0004*XM)                                          ISC32160
      SZ=0.14*XM/SQRT(1.+0.0003*XM)                                          ISC32170
      GO TO 60                                                               ISC32180
50    SY=0.11*XM/SQRT(1.+0.0004*XM)                                          ISC32190
      SZ=0.08*XM/SQRT(1.+0.0015*XM)                                          ISC32200
60    IF(SZ .GT. 5000.) SZ=5000.                                             ISC32210
      RETURN                                                                 ISC32220
      END                                                                    ISC32230
      FUNCTION XVY (SYO,KST)                                                 ISC32240
C** FUNCTION XVY (VERSION 86170) PART OF ISCST                               ISC32250
C        XVY CALCULATES THE VIRTUAL DISTANCE NECESSARY TO                    ISC32260
C        ACCOUNT FOR THE INITIAL CROSSWIND DISPERSION.                       ISC32270
C        BASED ON BRIGGS URBAN DISPERSION COEFFCIENTS.                       ISC32280
      DIMENSION A(6)                                                         ISC32290
      DATA A/.32,.32,.22,.16,.11,.11/                                        ISC32300
      DATA B/.0004/                                                          ISC32310
C** DIRECT SOLUTION FOR URBAN DISPERSION                                     ISC32320
70    XVY=(B*SYO**2+SQRT(B**2*SYO**4+4.*A(KST)**2*SYO**2))/                  ISC32330
     *(2.*A(KST)**2)                                                         ISC32340
C        CONVERT TO KILOMETERS                                               ISC32350
      XVY=XVY/1000.                                                          ISC32360
      RETURN                                                                 ISC32370
       END                                                                   ISC32380
      FUNCTION XVZ (SZO,KST)                                                 ISC32390
C** FUNCTION XVZ (VERSION 86170) PART OF ISCST                               ISC32400
C        XVZ CALCULATES THE VIRTUAL DISTANCE NECESSARY                       ISC32410
C        TO ACCOUNT FOR THE INITIAL VERTICAL DISPERSION.                     ISC32420
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C       BASED ON BRIGGS URBAN DISPERSION COEFFCIENTS                      ISC32430
      DIMENSION C(6),D(6)                                                 ISC32440
      DATA C /1.E06,1.E06,.20,.14,.08,.08/                                ISC32450
      DATA D /1.E09,1.E09,0.,.0003,.0015,.0015/                           ISC32460
C     DIRECT SOLUTION FOR URBAN DISPERSION                                ISC32470
170   GO TO (180,180,190,200,200,200), KST                                ISC32480
C     SOLUTION TO THE CUBIC EQUATION                                      ISC32490
C     FROM CRC MATHEMATICAL TABLES                                        ISC32500
C     STABILITY A&B (180)                                                 ISC32510
180   A=-C(KST)/3.                                                        ISC32520
      B=(2./27.-(SZO/240.)**2)*D(KST)                                     ISC32530
      S=B**2/4.+A**3/27.                                                  ISC32540
      IF(S .LT. 0.) GO TO 185                                             ISC32550
      S=SQRT(S)                                                           ISC32560
      E=1./3.                                                             ISC32570
      BA=(-B/2.+S)**E                                                     ISC32580
      BB=(-B/2.-S)**E                                                     ISC32590
      Y=BA+BB                                                             ISC32600
182   XVZ=Y-1000./3.                                                      ISC32610
      XVZ=XVZ/1000.                                                       ISC32620
      RETURN                                                              ISC32630
185   CS=(SZO/240.)**2*27./2.-1.                                          ISC32640
      TH=ACOS(CS)/3.                                                      ISC32650
      Y=2./3.*COS(TH)*1.E03                                               ISC32660
      GO TO 182                                                           ISC32670
C     STABILITY C(190)                                                    ISC32680
190   XVZ=SZO/C(KST)                                                      ISC32690
      XVZ=XVZ/1000.                                                       ISC32700
      RETURN                                                              ISC32710
C     STABILITY D,E,&F (200)                                              ISC32720
200   XVZ=(D(KST)*SZO**2+SQRT(D(KST)**2*SZO**4+4.*C(KST)**2               ISC32730
     **SZO**2))/(2.*C(KST)**2)                                            ISC32740
      XVZ=XVZ/1000.                                                       ISC32750
      RETURN                                                              ISC32760
       END                                                                ISC32770
      SUBROUTINE URBBAR(XB,BB,IST,IXDIST,IFLAG,XZ)                        ISC32780
C**** SUBROUTINE URBBAR (VERSION 86170) PART OF ISCST                     ISC32790
C     IF IFLAG = 1, NOTHING IS DONE                                       ISC32800
C     IF IFLAG = 2, CALCULATE AVERAGE 'B' ONLY.                           ISC32810
C     IF IFLAG = 3, CALCULATE EFFECTIVE DOWNWIND DISTANCE INDEX IXDIST    ISC32820
C                   AS A FUNCTION OF XB, XZ AND STABILITY.                ISC32830
C                                                                         ISC32840
C**** SUBROUTINE IS CALLED TWICE, FIRST TO CALCULATE DOWNWIND             ISC32850
C**** INDEX, THEN TO CALCULATE BBAR BASED ON BRIGGS URBAN DISP COEFFS.     ISC32860
C                                                                         ISC32870
      DIMENSION       B(38),X1(10,6),INDSGZ(6),XZ(38)                     ISC32880
C                                                                         ISC32890
      DATA INDSGZ /0,9,12,13,19,28/                                       ISC32900
      DATA X1 /.1,                                                        ISC32910
     1         .15,.2,.25,.3,.4,.5,3.11,1.E20,1*0.,  .2,.4,1.E20,7*0.,  ISC32920
     1 1.E20,9*0.,  .3,1.,3.,10.,30.,1.E20,4*0., .1,.3,1.,2.,4.,10.,20.,ISC32930
     2 40.,1.E20,1*0.,  .2,.7,1.,2.,3.,7.,15.,30.,60.,1.E20/              ISC32940
C                                                                         ISC32950
C**   VALUES OF A AND B FOR URBAN SIGMAS CALCULATED USING                 ISC32960
C**   LEAST SQUARES FIT OF Y=A*X**B TO TWO KNOWN SIGMA VALUES             ISC32970
C                                                                         ISC32980
     DATA B/1.05481,1.05481,1.07397,1.09147,1.10755,1.12880,1.15459,      ISC32990
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     *    1.27573,1.39840,  1.06277,1.11120,1.19463,  1.0,                ISC33000
     *    .97423,.92683,.82729,.69084,.58298,.54401,                      ISC33010
     *    .89450,.89450,.77378,.66096,.59632,.54890,.52290,.51173,        ISC33020
     *    .50737,  .91156,.81821,.72180,.66096,.60730,.56473,             ISC33030
     *    .53115,.51551,.50788,.50452/                                    ISC33040
      GOTO (60,90,10,10) , IFLAG                                          ISC33050
C     NOTE THAT STABILITY CATEGORY C HAS ONLY 1 DISTANCE CATEGORY.        ISC33060
   10 IF(IST .NE. 3) GOTO 20                                              ISC33070
      IXDIST = 13                                                         ISC33080
      RETURN                                                              ISC33090
   20 X = XB                                                              ISC33100
      I = 1                                                               ISC33110
      II = 0                                                              ISC33120
   30 IF(X-X1(I,IST) .LE. 0.0) GOTO 40                                    ISC33130
      I = I + 1                                                           ISC33140
      GOTO 30                                                             ISC33150
   40 IF(I-II) 50,60,70                                                   ISC33160
   50 IXDIST = IXDIST - 1                                                 ISC33170
   60 RETURN                                                              ISC33180
   70 II = I                                                              ISC33190
      IXDIST = INDSGZ(IST) + I                                            ISC33200
      IF (IFLAG .GT. 3) RETURN                                            ISC33210
      X=XB+XZ(IXDIST)                                                     ISC33220
      GOTO 30                                                             ISC33230
C     CALCULATE AVERAGE 'B'.                                              ISC33240
   90 BB = 0.0                                                            ISC33250
      I = IXDIST - INDSGZ(IST)                                            ISC33260
      DO 100 J = 1,I                                                      ISC33270
      I1 = INDSGZ(IST) + J                                                ISC33280
  100 BB = BB + B(I1)                                                     ISC33290
      BB = BB/FLOAT(I)                                                    ISC33300
      RETURN                                                              ISC33310
      END                                                                 ISC33320
      SUBROUTINE NMCALM(IDY)                                              ISC33330
C     SUBROUTINE NMCALM (VERSION 86170) PART OF ISCST                     ISC33340
C                                                                         ISC33350
C     SUBROUTINE TO DETERMINE THE NUMBER OF CALM HOURS                    ISC33360
C     FOR EACH AVERAGING PERIOD PER DAY.  A CALM HOUR IS                  ISC33370
C     DIAGNOSED AS AN HOUR HAVING A WIND SPEED OF 1.0 M/SEC               ISC33380
C     AND THE SAME WIND DIRECTION AS THE HOUR BEFORE.                     ISC33390
C     USED IF ISW(27) = 1                                                 ISC33400
C     CREATED BY TRC ENVIRONMENTAL CONSULTANTS                            ISC33410
C     JULY 1985                                                           ISC33420
C                                                                         ISC33430
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,          ISC33440
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE,   ISC33450
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT            ISC33460
      COMMON /MET/ IDAY(366),ISTAB(24),AWS(24),TEMP(24),AFV(24),          ISC33470
     1 AFVR(24),HLH(24,2),P(24),DTHDZ(24),DECAY(24),PDEF(6,6),            ISC33480
     2 DTHDEF(6,6),ZR,DDECAY,IMET,ITAP,TK,UCATS(5)                        ISC33490
      COMMON /CALM/ NC(24),OLDAFV,NCM6(4),NCM8(3),NCM12(2),NCM24,         ISC33500
     *NCMYR,IFLAGC(8),NCM4(6)                                             ISC33510
C                                                                         ISC33520
C     SET CALM ARRAY TO ZERO FOR THE DAY                                  ISC33530
      DO 100 I=1,24                                                       ISC33540
      NC(I)=0                                                             ISC33550
  100 CONTINUE                                                            ISC33560
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C                                                                       ISC33570
C     DETERMINE CALM HOURS                                              ISC33580
C                                                                       ISC33590
      IPRINT=0                                                          ISC33600
      DO 200 J=1,24                                                     ISC33610
      TAFV=ABS(OLDAFV-AFV(J))                                           ISC33620
      IF(AWS(J) .LT. 1.01 .AND. TAFV .LT. 0.01) THEN                    ISC33630
      NC(J)=1                                                           ISC33640
      IPRINT=1                                                          ISC33650
      NCMYR=NCMYR+1                                                     ISC33660
      END IF                                                            ISC33670
C     RESET OLD WIND DIRECTION                                          ISC33680
      OLDAFV=AFV(J)                                                     ISC33690
  200 CONTINUE                                                          ISC33700
C                                                                       ISC33710
      IF(IPRINT .EQ. 1) WRITE(IO,1000) IDY,(NC(I),I=1,24)               ISC33720
 1000 FORMAT(1X,25H* CALM HOURS (=1) FOR DAY,I4,2H *,24I3)              ISC33730
C                                                                       ISC33740
C     NOW HAVE CALM HOURS DETERMINED                                    ISC33750
C     SET COUNTERS FOR EACH AVERAGING PERIOD                            ISC33760
C     AT MAXIMUM VALUE AND DETERMINE NUMBER OF                          ISC33770
C     NON CALM HOURS FOR SPECIFIED AVERAGING PERIODS.                   ISC33780
C     THE ONLY ONES THAT VARY ARE 4, 6, 8, 12, AND 24 HOUR              ISC33790
C     AVERAGES.  SET COUNTERS TO MAXIMUM PERMISSIBLE VALUES.            ISC33800
C                                                                       ISC33810
      DO 300 I=1,5                                                      ISC33820
      IF(ISW(I+9) .NE. 1) GO TO 300                                     ISC33830
      GO TO (205,210,220,230,240),I                                     ISC33840
C     4-HR AVERAGE                                                      ISC33850
  205 DO 206 J=1,6                                                      ISC33860
  206 NCM4(J)=4                                                         ISC33870
      DO 207 K=4,24,4                                                   ISC33880
      N=K-3                                                             ISC33890
      DO 208 L=N,K                                                      ISC33900
      KK=K/4                                                            ISC33910
  208 IF(NC(L).EQ.1) NCM4(KK)=NCM4(KK)-1                                ISC33920
      IF(NCM4(KK).LT.3) NCM4(KK)=3                                      ISC33930
  207 CONTINUE                                                          ISC33940
      GO TO 300                                                         ISC33950
C     6-HOUR AVERAGE                                                    ISC33960
  210 DO 211 J=1,4                                                      ISC33970
      NCM6(J)=6                                                         ISC33980
  211 CONTINUE                                                          ISC33990
      DO 215 K=6,24,6                                                   ISC34000
      N=K-5                                                             ISC34010
      DO 213 L=N,K                                                      ISC34020
      KK=K/6                                                            ISC34030
      IF(NC(L) .EQ. 1) NCM6(KK)=NCM6(KK)-1                              ISC34040
  213 CONTINUE                                                          ISC34050
      IF(NCM6(KK) .LT. 5) NCM6(KK)=5                                    ISC34060
  215 CONTINUE                                                          ISC34070
      GO TO 300                                                         ISC34080
C     8-HOUR AVERAGE                                                    ISC34090
  220 DO 221 J=1,3                                                      ISC34100
      NCM8(J)=8                                                         ISC34110
  221 CONTINUE                                                          ISC34120
      DO 225 K=8,24,8                                                   ISC34130
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      N=K-7                                                              ISC34140
      DO 223 L=N,K                                                       ISC34150
      KK=K/8                                                             ISC34160
      IF(NC(L) .EQ. 1) NCM8(KK)=NCM8(KK)-1                               ISC34170
223   CONTINUE                                                           ISC34180
      IF(NCM8(KK) .LT. 6) NCM8(KK)=6                                     ISC34190
225   CONTINUE                                                           ISC34200
      GO TO 300                                                          ISC34210
C     12-HOUR AVERAGE                                                    ISC34220
230   DO 231 J=1,2                                                       ISC34230
      NCM12(J)=12                                                        ISC34240
231   CONTINUE                                                           ISC34250
      DO 235 K=12,24,12                                                  ISC34260
      N=K-11                                                             ISC34270
      DO 233 L=N,K                                                       ISC34280
      KK=K/12                                                            ISC34290
      IF(NC(L) .EQ. 1) NCM12(KK)=NCM12(KK)-1                             ISC34300
233   CONTINUE                                                           ISC34310
      IF(NCM12(KK) .LT. 9) NCM12(KK)=9                                   ISC34320
235   CONTINUE                                                           ISC34330
      GO TO 300                                                          ISC34340
C     24-HOUR AVERAGE                                                    ISC34350
240   NCM24=24                                                           ISC34360
      DO 245 K=1,24                                                      ISC34370
      IF(NC(K) .EQ. 1) NCM24=NCM24-1                                     ISC34380
245   CONTINUE                                                           ISC34390
      IF(NCM24 .LT. 18) NCM24=18                                         ISC34400
300   CONTINUE                                                           ISC34410
C                                                                        ISC34420
C     ALL COUNTERS ARE NOW SET                                           ISC34430
C     RETURN TO MAIN PROGRAM                                             ISC34440
      RETURN                                                             ISC34450
      END                                                                ISC34460
      SUBROUTINE AVCALM(I,IHR,A1)                                        ISC34470
C     SUBROUTINE AVCALM (VERSION 86170) PART OF ISCST                    ISC34480
C     SUBROUTINE TO DETERMINE THE MULTIPLIER (1/SUM) FOR                 ISC34490
C     EACH AVERAGING PERIOD                                              ISC34500
C     ONLY NEED TO CHANGE MULTIPLIER FOR 4, 6, 8, 12, AND 24             ISC34510
C     HOUR AVERAGES IF CALM OPTION IS SELECTED.                          ISC34520
C                                                                        ISC34530
      DIMENSION N4(24),N6(24),N8(24),N12(24)                             ISC34540
      COMMON /CALM/ NC(24),OLDAFV,NCM6(4),NCM8(3),NCM12(2),NCM24,        ISC34550
     *NCMYR,IFLAGC(8),NCM4(6)                                            ISC34560
      DATA N6/6*1,6*2,6*3,6*4/,N8/8*1,8*2,8*3/,N12/12*1,12*2/            ISC34570
      DATA N4/4*1,4*2,4*3,4*4,4*5,4*6/                                   ISC34580
C                                                                        ISC34590
      J=I-3                                                              ISC34600
      GO TO (10,20,30,40,50),J                                           ISC34610
C     4-HR AVERAGE                                                       ISC34620
 10   L=N4(IHR)                                                          ISC34630
      A1=1./NCM4(L)                                                      ISC34640
      RETURN                                                             ISC34650
C     6-HOUR AVERAGE                                                     ISC34660
20    L=N6(IHR)                                                          ISC34670
      A1=1./NCM6(L)                                                      ISC34680
      RETURN                                                             ISC34690
C     8-HOUR AVERAGE                                                     ISC34700
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 30   L=N8(IHR)                                                          ISC34710
      A1=1./NCM8(L)                                                      ISC34720
      RETURN                                                             ISC34730
C     12-HOUR AVERAGE                                                    ISC34740
 40   L=N12(IHR)                                                         ISC34750
      A1=1./NCM12(L)                                                     ISC34760
      RETURN                                                             ISC34770
C     24-HOUR AVERAGE                                                    ISC34780
 50   A1=1./NCM24                                                        ISC34790
      RETURN                                                             ISC34800
      END                                                                ISC34810
       SUBROUTINE MPR1(KST,TS,TEMP,F,D,VS,UPL,DELH,DTHDZ,DISTF)          ISC34820
C     SUBROUTINE MPR1 (VERSION 86170) PART OF ISCST                      ISC34830
C     MAJOR PORTIONS OF THIS CODE CAME FROM THE                          ISC34840
C     MPTER MODEL.                                                       ISC34850
C        PLUME RISE CALCULATION                                          ISC34860
      DELT=TS-TEMP                                                       ISC34870
      IF (KST.GT.4) GO TO 70                                             ISC34880
C        PLUME RISE FOR UNSTABLE CONDITIONS                              ISC34890
      IF (TS.LT.TEMP) GO TO 80                                           ISC34900
      IF (F.GE.55.) GO TO 60                                             ISC34910
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F<55)         ISC34920
C        FOUND BY EQUATING BRIGGS(1969) EQ 5.2, P.59 WITH COMBINATION OFISC34930
C        BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F<55.            ISC34940
      DTMB=0.0297*TS*VS**0.33333/D**0.66667                              ISC34950
      IF (DELT.LT.DTMB) GO TO 80                                         ISC34960
C        DISTANCE OF FINAL BUOYANT RISE(0.049 IS 14*3.5/1000)            ISC34970
C        BRIGGS(1971) EQN. 7,F<55, AND DIST TO FINAL RISE IS 3.5 XSTAR   ISC34980
C        DISTF IN KILOMETERS                                             ISC34990
      DISTF=0.049*F**0.625                                               ISC35000
C        COMBINATION OF BRIGGS(1971) EQNS. 6 AND 7, PAGE 1031 FOR F<55. ISC35010
      DELH=21.425*F**0.75/UPL                                            ISC35020
      GO TO 100                                                          ISC35030
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F>55)         ISC35040
C        FOUND BY EQUATING BRIGGS(1969) EQ 5.2, P.59 WITH COMBINATION OFISC35050
C         BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F>55.           ISC35060
 60   DTMB=0.00575*TS*VS**0.66667/D**0.33333                             ISC35070
      IF (DELT.LT.DTMB) GO TO 80                                         ISC35080
C        DISTANCE OF FINAL BUOYANT RISE (0.119 IS 34*3.5/1000)           ISC35090
C        BRIGGS(1971) EQN. 7, F>55, AND DIST TO FINAL RISE IS 3.5 XSTAR. ISC35100
C        DISTF IN KILOMETERS                                             ISC35110
      DISTF=0.119*F**0.4                                                 ISC35120
C        COMBINATION OF BRIGGS(1971) EQNS. 6 AND 7, PAGE 1031 FOR F>55.  ISC35130
      DELH=38.71*F**0.6/UPL                                              ISC35140
      GO TO 100                                                          ISC35150
C        PLUME RISE FOR STABLE CONDITIONS.                               ISC35160
 70   S=9.80616*DTHDZ/TEMP                                               ISC35170
      IF (TS.LT.TEMP) GO TO 90                                           ISC35180
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(STABLE)       ISC35190
C        FOUND BY EQUATING BRIGGS(1975) EQ 59, P. 96 FOR STABLE BUOYANCYISC35200
C        RISE WITH BRIGGS(1969) EQ 4.28, P. 59 FOR STABLE MOMENTUM RISE.ISC35210
      DTMB=0.019582*TEMP*VS*SQRT(S)                                      ISC35220
      IF (DELT.LT.DTMB) GO TO 90                                         ISC35230
C        STABLE BUOYANT RISE FOR WIND CONDITIONS.(WIND NOT ALLOWED LOW   ISC35240
C        ENOUGH TO REQUIRE STABLE RISE IN CALM CONDITIONS.)              ISC35250
C        BRIGGS(1975) EQ 59, PAGE 96.                                    ISC35260
      DELH=2.6*(F/(UPL*S))**0.333333                                     ISC35270
```

```
C         COMBINATION OF BRIGGS(1975) EQ 48 AND EQ 59. NOTE DISTF IN KM. ISC35280
      DISTF=0.0020715*UPL/SQRT(S)                                        ISC35290
      GO TO 100                                                          ISC35300
C         UNSTABLE-NEUTRAL MOMENTUM RISE                                 ISC35310
C         BRIGGS(1969) EQN. 5.2, PAGE 59 NOTE: MOST ACCURATE WHEN VS/U>4;ISC35320
C         TENDS TO OVERESTIMATE RISE WHEN VS/U<4 (SEE BRIGGS(1975) P. 78,ISC35330
C          FIGURE 4.)                                                    ISC35340
80    DELH=3.*VS*D/UPL                                                   ISC35350
      DISTF=0.                                                           ISC35360
      GO TO 100                                                          ISC35370
C         STABLE MOMENTUM RISE                                           ISC35380
90    DHA=3.*VS*D/UPL                                                    ISC35390
C         BRIGGS(1969) EQUATION 4.28, PAGE 59                            ISC35400
      DELH=1.5*(VS*VS*D*D*TEMP/(4.*TS*UPL))**0.333333/S**0.166667        ISC35410
      IF (DHA.LT.DELH) DELH=DHA                                          ISC35420
      DISTF=0.                                                           ISC35430
C         STORE OFF PLUME HEIGHT(ETC.) FOR THIS SOURCE FOR USE WITH      ISC35440
C         OTHER RECEPTORS.                                               ISC35450
 100    RETURN                                                          ISC35460
       END                                                               ISC35470
EOF:3547
0:
END ED. NO CORRECTIONS APPLIED
```

APPENDIX B

COMPLETE FORTRAN LISTING OF THE

INDUSTRIAL SOURCE COMPLEX

LONG TERM MODEL (ISCLT)

COMPUTER PROGRAM

```
ED 16R1C TUE-07/22/86-09:04:57-(46,)
EDIT
0:
C******      ISCLT (REVISION 14, 6/86)  VERSION 86170                    ISC00010
C******       INDUSTRIAL SOURCE COMPLEX LONG TERM MODEL                  ISC00020
C                    SOURCE: UNAMAP FILE ON EPA'S UNIVAC 1110, RTP, NC. ISC00030
C     THIS VERSION OF ISCLT WAS PREPARED IN  JUNE,1986                   ISC00040
C     BY TRC ENVIRONMENTAL CONSULTANTS INC. FROM THE                     ISC00050
C     VERSION CONTAINED IN UNAMAP VERSION 5.                             ISC00060
C     THE FOLLOWING FEATURES HAVE BEEN ADDED:                            ISC00070
C        OPTION FOR BRIGGS URBAN DISPERSION COEFFICIENTS.                ISC00080
C        A PLUME RISE FORMULATION THAT IS                                ISC00090
C        CONSISTENT WITH THE MPTER MODEL.                                ISC00100
C        OPTION FOR BUOYANCY INDUCED DISPERSION, ISW(21).                ISC00110
C        THE MINIMUM SOURCE-RECEPTOR DISTANCE HAS                        ISC00120
C        BEEN REDUCED FROM 100M TO 1M.                                   ISC00130
C        REVISIONS THROUGH H.E. CRAMER CO.'S                             ISC00140
C        UPDATE PACKAGE HAVE BEEN INCLUDED.                              ISC00150
C        POLLUTANT INDICATOR OPTION, ISW(23).                            ISC00160
C        A " REGULATORY DEFAULT OPTION" SWITCH, ISW(22).                 ISC00170
C        DEFAULT WIND PROFILE COEFFICIENTS FOR                           ISC00180
C        RURAL AND URBAN OPTIONS.                                        ISC00190
C        RECEPTORS BELOW PLANT GRADE ARE TREATED IN                      ISC00200
C        THE SAME MANNER AS RECEPTORS ABOVE                              ISC00210
C        PLANT GRADE.                                                    ISC00220
C        A TERRIN TRUNCATION ALGORITHM FOR RECEPTORS ABOVE               ISC00230
C        STACK HEIGHT.                                                   ISC00240
C        AN INPUT DEBUG OPTION  (ISW(24)) HAS BEEN ADDED.                ISC00250
C                                                                        ISC00260
      COMMON CORE(40000)                                                 ISC00270
C                                                                        ISC00280
      COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,NSTBLE,     ISC00290
     1NSCTOR,ISW(24),UNITS(20),TITLE(20),NOFILE                          ISC00300
      COMMON /MET/ FREQ(6,16,24),TA(6,4),HM(6,6,4),DPDZ(6,6),UBAR(6),    ISC00310
     1P(6,6),PHI(16),ROTATE,G,ZR,DECAY,TK                                ISC00320
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES,  ISC00330
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3-2),ITSAVE(572),NT1,NT2,NT3,NT4ISC00340
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC00350
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY                             ISC00360
      DIMENSION JSW(24),MSOR(72),NSOR(72),ITEMP(200)                     ISC00370
      EQUIVALENCE (ITEMP(1),FREQ(1,1,1)),(ITEMP(1),JSW(1)),(ITEMP(25),MSISC00380
     1OR(1)),(NSOURC,NSOR(1))                                           ISC00390
      INTEGER TITLE,UNITS                                               ISC00400
      DATA NOCOMB/20*0/,J5/4H    /                                      ISC00410
C                                                                        ISC00420
C                                                                        ISC00430
C                                                                        ISC00440
C                                                                        ISC00450
C     THIS COMPUTER PROGRAM IS DESIGNED TO CALCULATE THE AVERAGE         ISC00460
C     SEASONAL AND/OR ANNUAL GROUND LEVEL CONCENTRATION OR TOTAL         ISC00470
C     DEPOSITION FROM MULTIPLE CONTINUOUS POINT, VOLUME AND/OR AREA      ISC00480
C     SOURCES. THE CALCULATION GRID SYSTEM CAN BE A CARTESIAN COORDINATEISC00490
C     SYSTEM WITH 0 DEGREES NORTH AS THE POSITIVE Y AXIS AND 90 DEGREES ISC00500
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C     EAST AS THE POSITIVE X AXIS OR A POLAR COORDINATE SYSTEM WITH X   ISC00510
C     AS THE AXIS OF RADIAL ARCS AND Y AS THE AXIS OF AZIMUTH BEARINGS  ISC00520
C     WITH 0 DEGREES AS NORTH INCREASING POSITIVELY IN A CLOCKWISE      ISC00530
C     DIRECTION. ALSO, PROVISION IS MADE FOR SPECIAL DISCRETE           ISC00540
C     X,Y RECEPTOR POINTS THAT MAY CORRESPOND TO SAMPLER SITES, POINTS  ISC00550
C     OF MAXIMA OR SPECIAL POINTS OF INTEREST. SOURCES CAN BE           ISC00560
C     POSITIONED ANYWHERE RELATIVE TO THE GRID SYSTEM.                  ISC00570
C                                                                       ISC00580
C                                                                       ISC00590
C     THIS COMPUTER PROGRAM IS WRITTEN IN STANDARD FORTRAN 77 AND IS    ISC00600
C     DESIGNED FOR USE ON MOST MEDIUM SIZED COMPUTERS (IBM 360,370 -    ISC00610
C     CDC 6000 SERIES, UNIVAC 1100 SERIES, ETC). ALL ALPHANUMERIC       ISC00620
C     (HOLLERITH) INFORMATION IS STORED 4 CHARACTERS (BYTES) TO AN      ISC00630
C     INTEGER WORD. ALSO, THE VALUES OF SOME VARIABLES IN THE PROGRAM   ISC00640
C     ASSUME AT LEAST A 32 BIT WORD. THE FUNCTION ACOS IS REFERENCED    ISC00650
C     IN THIS PROGRAM IN SUBROUTINE DISTR AND MUST BE CHANGED TO ARCOS  ISC00660
C     FOR IBM FORTRAN COMPILERS.                                        ISC00670
C     BLANK COMMON IS USED TO STORE THE GRID SYSTEM AND ALL CALCULATION ISC00680
C     RECEPTOR POINTS AND THE CONCENTRATION (DEPOSITION) ARRAYS.        ISC00690
C     THE AMOUNT OF CORE IN BLANK COMMON USED BY                        ISC00700
C     EACH VARIABLE IS DETERMINED AT EXECUTION TIME AND THE EQUATION    ISC00710
C     OF CORE USED IN BLANK COMMON IS                                   ISC00720
C                                                                       ISC00730
C          CORE = (NXPNTS*NYPNTS*2*NXWYPT)+((2*NSEASN*I)*(NXPNTS*NYPNTS+ISC00740
C                 NXWYPT))                                              ISC00750
C                                                                       ISC00760
C                      WHERE I = 0 IF TERRAIN ELEVATIONS ARE NOT USED   ISC00770
C                                  (ISW(4)=0)                           ISC00780
C                            I = 1 IF TERRAIN ELEVATIONS ARE USED       ISC00790
C                                  (ISW(4)=1 OR -1)                     ISC00800
C                                                                       ISC00810
C     SLIGHT EXCEPTIONS TO THIS EQUATION OCCUR UNDER TWO PROGRAM        ISC00820
C     OPTIONS. THEY ARE NGROUP AND ISW(11) AND MAY SUPERCEDE THE ABOVE  ISC00830
C     EQUATION IF REQUIREMENT C OF EITHER OPTION IS USED.               ISC00840
C     THE VALUE OF CORE MUST BE LESS THAN OR EQUAL TO THE TOTAL SIZE    ISC00850
C     OF THE ARRAY CORE IN BLANK COMMON AT THE BEGINNING OF THIS        ISC00860
C     PROGRAM. ALSO, THE VARIABLE IEND FOLLOWING THE INPUT DATA COMMENT ISC00870
C     CARDS MUST BE SET EQUAL TO THE TOTAL SIZE OF THE ARRAY CORE IN    ISC00880
C     BLANK COMMON.                                                     ISC00890
C                                                                       ISC00900
C                                                                       ISC00910
C                                                                       ISC00920
C                                                                       ISC00930
C*****************LONG TERM ISC MODEL PROGRAM INPUTS *******************ISC00940
C                                                                       ISC00950
C     THE BELOW EXPLANATION OF THE PROGRAM INPUTS IS MEANT FOR THE      ISC00960
C     EXPERIENCED USER. PLEASE READ THE MAIN PROGRAM DOCUMENTATION      ISC00970
C     CAREFULLY BEFORE USING THIS PROGRAM AS A SINGLE ERROR CAN MAKE    ISC00980
C     THE ENTIRE RESULTS ERRONEOUS.                                     ISC00990
C                                                                       ISC01000
C                                                                       ISC01010
C-CARD GROUP 1 (20A4 FORMAT)                                            ISC01020
C     TITLE - UP TO 80 CHARACTERS OF CASE TITLING INFORMATION           ISC01030
C             (CARD COL. 1-80)                                          ISC01040
C                                                                       ISC01050
C-CARD GROUP 2 (2412 FORMAT)                                            ISC01060
C     ISW - ARRAY CONTAINING PROGRAM OPTIONS                            ISC01070
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C        NOTE - IF USING AN INPUT TAPE OPTIONS ISW(1), (2), (3), AND   ISC01080
C               (4) ARE SET BY THE INPUT TAPE AND THE PROGRAM IGNORES  ISC01090
C               ANY CARD VALUE.                                        ISC01100
C        ISW(1)  - (CARD COL. 2)                                       ISC01110
C                  IF = 0 OR 1 CONCENTRATION IS CALCULATED.            ISC01120
C                 IF = 2 TOTAL DEPOSITION IS CALCULATED.               ISC01130
C                  THIS OPTION IS IGNORED IF USING AN INPUT TAPE.      ISC01140
C        ISW(2)  - (CARD COL. 4)                                       ISC01150
C                  IF = 0 OR 1 THE GRID SYSTEM X AND Y AXES ARE ASSUMEDISC01160
C                         TO DEFINE A CARTESIAN COORDINATE SYSTEM WITH ISC01170
C                         NEGATIVE X AS WEST (270 DEG), POSITIVE X     ISC01180
C                         AS EAST (90 DEG), NEG. Y AS SOUTH (180 DEG)  ISC01190
C                         AND POS. Y AS NORTH (0 DEG).                 ISC01200
C                 IF = 2 THE GRID SYSTEM X AND Y AXES ARE ASSUMED TO   ISC01210
C                         DEFINE A POLAR COORDINATE SYSTEM WHERE THE X ISC01220
C                         AXIS DEFINES THE POLAR RADIALS AND THE Y AXIS ISC01230
C                         DEFINES THE ANGULAR COORDINATES (AZIMUTH     ISC01240
C                         BEARING). Y IS MEASURE IN A CLOCKWISE        ISC01250
C                         DIRECTION STARTING AT 0 DEGREES NORTH.       ISC01260
C                  THIS OPTION IS IGNORED IF USING AN INPUT TAPE.      ISC01270
C        ISW(3)  - (CARD COL. 6)                                       ISC01280
C                  IF = 0 OR 1 THE PROGRAM ASSUMES THE SPECIAL DISCRETEISC01290
C                              X,Y CALCULATION RECEPTOR POINTS ARE     ISC01300
C                             IN CARTESIAN COORDINATES.                ISC01310
C                 IF = 2 THE PROGRAM ASSUMES THE X,Y SPECIAL DISCRETE  ISC01320
C                         CALCULATION RECEPTOR POINTS ARE IN           ISC01330
C                         POLAR COORDINATES.                           ISC01340
C                  THIS OPTION IS IGNORED IF USING AN INPUT TAPE,      ISC01350
C        ISW(4)  - (CARD COL. 8)                                       ISC01360
C                  IF = 0 NO TERRAIN ELEVATION DATA IS READ BY THE     ISC01370
C                         PROGRAM                                      ISC01380
C                 IF = 1 TERRAIN ELEVATION DATA IS READ. IF = -1, THEN ISC01390
C                 ELEVATIONS ARE IN METERS RATHER THAN FEET.           ISC01400
C                  THIS OPTION IS IGNORED BY THE PROGRAM IF USING AN   ISC01410
C                 INPUT TAPE OR FILE.                                  ISC01420
C        ISW(5)  - (CARD COL. 10)                                      ISC01430
C                  IF = 0 NO MASTER SAVE TAPE (SCRATCH TAPE) INPUT OR  ISC01440
C                         OUTPUT IS ASSUMED.                           ISC01450
C                 IF = 1 ALL PROGRAM INPUT DATA, SOURCE DATA AND       ISC01460
C                         CALCULATIONS ARE WRITTEN TO MASTER SAVE TAPE ISC01470
C                          ON FORTRAN LOGICAL UNIT ISW(15). TWO FILE   ISC01480
C                         MARKS ARE WRITTEN AFTER THE LAST RECORD ON   ISC01490
C                         TAPE. THE TAPE IS BINARY AND THE LAST RECORD ISC01500
C                         WRITTEN ON TAPE HAS AN INTEGER 999999 IN WORD ISC01510
C                         1 TO INDICATE END OF DATA.                   ISC01520
C                                                                      ISC01530
C                          - TAPE RECORD -          - CONTENTS -      ISC01540
C                                1     -   COMMON BLOCK /DIM/, 72 WORDSISC01550
C                                2     -   X AXIS AND X SPECIAL POINTS,ISC01560
C                                          NXPNTS+NXWYPT WORDS         ISC01570
C                                3     -   Y AXIS AND Y SPECIAL POINTS,ISC01580
C                                          NYPNTS+NXWYPT WORDS         ISC01590
C                                4     -   TERRAIN ELEVATIONS Z, ONLY  ISC01600
C                                          IF ISW(4) IS GREATER THAN 0.ISC01610
C                                5     -   COMMON BLOCK /MET/, 2571    ISC01620
C                                          WORDS                       ISC01630
C                                6     -   COMMON BLOCK /SORC/, 219    ISC01640
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C                                          WORDS, SOURCE RECORD          ISC01650
C                                 7    -   CONCENTRATION (DEPOSITION)    ISC01660
C                                          FOR SEASON 1, NXPNTS*NYPNTS   ISC01670
C                                          *NXWYPT WORDS.                ISC01680
C                                 8    -   CONCENTRATION (DEPOSITION)    ISC01690
C                                          FOR SEASON 2 (IF PRESENT)     ISC01700
C                                 9    -   CONCENTRATION (DEPOSITION)    ISC01710
C                                          FOR SEASON 3 (IF PRESENT)     ISC01720
C                                10    -   CONCENTRATION (DEPOSITION)    ISC01730
C                                          FOR SEASON 4 (IF PRESENT)     ISC01740
C                          RECORDS 6 THROUGH 10 ARE REPEATED FOR EACH    ISC01750
C                          SOURCE INPUT.                                 ISC01760
C                IF = 2 PROGRAM INPUT DATA, SOURCE DATA, AND PREVIOUS    ISC01770
C                       CALCULATIONS ARE READ FROM MASTER SAVE TAPE     ISC01780
C                       ON FORTRAN LOGICAL UNIT ISW(14) FOR UPDATE AND  ISC01790
C                       /OR DISPLAY.                                    ISC01800
C                IF = 3 MASTER SAVE TAPES ARE BOTH READ AND WRITTEN     ISC01810
C        ISW(6)  - (CARD COL. 12)                                       ISC01820
C                 IF = 0 DO NOT PRINT INPUT DATA. THIS INCLUDES SOURCE  ISC01830
C                        DATA.                                          ISC01840
C                 IF = 1 PRINT ALL INPUT DATA EXCEPT SOURCE DATA.       ISC01850
C                 IF = 2 PRINT SOURCE INPUT DATA ONLY.                  ISC01860
C                 IF = 3 PRINT ALL INPUT DATA.                          ISC01870
C        ISW(7)  - (CARD COL. 14)                                       ISC01880
C                 IF = 1 PRINT SEASONAL CONCENTRATION(DEPOSITION) ONLY  ISC01890
C                IF = 2 PRINT ANNUAL CONCENTRATION (DEPOSITION) ONLY,   ISC01900
C                       (USED PRIMARILY WHEN INPUT DATA IS ANNUAL       ISC01910
C                        ONLY)                                          ISC01920
C                IF = 0 OR 3 BOTH SEASONAL AND ANNUAL CONCENTRATION     ISC01930
C                       (DEPOSITION) ARE PRINTED.                       ISC01940
C        ISW(8)  - (CARD COL. 16)                                       ISC01950
C                 IF = 1 PRINT ONLY THE CONCENTRATION (DEPOSITION)      ISC01960
C                        FROM SELECTED INDIVIDUAL SOURCES. (SEE NOCOMB  ISC01970
C                        AND IDSORC BELOW).                             ISC01980
C                 IF = 2 PRINT ONLY THE COMBINED CONCENTRATION          ISC01990
C                        (DEPOSITION) SUMMED OVER THE SPECIFIED         ISC02000
C                        SOURCES.                                       ISC02010
C                 IF = 0 OR 3 PRINT BOTH SELECTED INDIVIDUAL SOURCES    ISC02020
C                        AND THE COMBINED SUM OVER THE SPECIFIED        ISC02030
C                        SOURCES.                                       ISC02040
C        ISW(9)  - (CARD COL. 18)                                       ISC02050
C                 USED TO DEFINE THE STABILITY MODE USED IN THE         ISC02060
C                CALCULATIONS OF THE STANDARD DEVIATIONS OF THE         ISC02070
C                LATERAL AND VERTICAL CONCENTRATION (DEPOSITION)        ISC02080
C                DISTRIBUTIONS AND THE VIRTUAL DISTANCES.               ISC02090
C                THIS PARAMETER MUST BE SET CORRECTLY IF INPUT DATA     ISC02100
C                CARD SOURCES ARE BEING PROCESSED.                      ISC02110
C                IF = 1 THE PROGRAM ASSUMES URBAN MODE 1 AND D, E AND   ISC02120
C                       F CATEGORIES ARE REDEFINED AS D.                ISC02130
C                IF = 2 THE PROGRAM ASSUMES URBAN MODE 2 AND STABILITY  ISC02140
C                       CATEGORIES 1 AND 2 ARE A, 3 IS B, 4 IS C AND    ISC02150
C                       5 AND 6 ARE D.                                  ISC02160
C                IF = 0, 3 OR BLANK THEPROGRAM ASSUMES RURAL MODE       ISC02170
C                       1 AND DEFINES STABILITY CATEGORIES 1 TO 6 TO    ISC02180
C                       BE A THROUGH F.                                 ISC02190
C                IF=4 THE PROGRAM ASSUMES URBAN MODE 3 AND DEFINES      ISC02200
C                       STABILITY CATEGORIES 1 TO 6 TO BE A THROUGH     ISC02210
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C                    F. BRIGGS URBAN DISPERSION COEFFICIENTS          ISC02220
C                    ARE USED.                                        ISC02230
C          ISW(10) - (CARD COL. 20)                                   ISC02240
C                    ISW(10), ISW(11) AND ISW(12) ARE USED TO SPECIFY HOWISC02250
C               THE PROGRAM IS TO CALCULATE AND DISPLAY MAXIMUM VALUES. ISC02260
C               IF ISW(10) IS LEFT BLANK OR ZERO IS PUNCHED THE MAXIMUM ISC02270
C               10 VALUES OF CONCENTRATION OR DEPOSITION ARE NOT        ISC02280
C               CALCULATED AND THE CONCENTRATION OR DEPOSITION AT ALL   ISC02290
C               INPUT GRID SYSTEM AND SPECIAL DISCRETE RECEPTOR POINTS  ISC02300
C               IS PRINTED.                                             ISC02310
C               IF ISW(10) EQUALS 1 THE MAXIMUM 10 VALUES ARE CALCULATEDISC02320
C               ACCORDING TO ISW(11) AND ISW(12) AND ONLY THESE MAXIMUM ISC02330
C               VALUES ARE PRINTED.                                     ISC02340
C               IF ISW(10) EQUALS 2 THE MAXIMUM 10 VALUES ARE CALCULATEDISC02350
C               ACCORDING TO ISW(11) AND ISW(12) AND PRINTED, AS WELL   ISC02360
C               AS, THE CONCENTRATION OR DEPOSITION AT ALL OTHER INPUT  ISC02370
C               RECEPTOR POINTS.                                        ISC02380
C          ISW(11) - (CARD COL. 22)                                     ISC02390
C                    IF SET NON-ZERO THE PROGRAM DETERMINES THE MAX. 10 ISC02400
C               VALUES OF CONCENTRATION OR DEPOSITION FROM THE SET OF   ISC02410
C               INPUT GRID SYSTEM AND ARBITRARILY SPACED RECEPTOR       ISC02420
C               POINTS. (IF NON-ZERO THEN ISW(12) MUST BE ZERO)         ISC02430
C               IF SET EQUAL TO 1 THE MAXIMUM 10 VALUES OF EACH         ISC02440
C               INDIVIDUAL SOURCE AND COMBINED SOURCES ARE CALCULATED   ISC02450
C               AND PRINTED INDEPENDENTLY OF EACH OTHER.                ISC02460
C               IF SET EQUAL TO 2 THE MAXIMUM 10 VALUES OF THE COMBINED ISC02470
C               SOURCES DETERMINES WHICH 10 POINTS OF EACH CONTRIBUTING ISC02480
C               SOURCE TO PRINT.                                        ISC02490
C          *** WARNING - THIS OPTION REQUIRES AT LEAST ONE OF THE       ISC02500
C                        FOLLOWING -                                    ISC02510
C                    A - THE PROGRAM USES AN OUTPUT TAPE.               ISC02520
C                    B - THE PROGRAM USES AN INPUT TAPE AND NO INPUT    ISC02530
C                        CARD SOURCES.                                  ISC02540
C                    C - THE TOTAL NUMBER OF SOURCES USED TO FORM EACH  ISC02550
C                        COMBINATION OF SOURCES FOR MAXIMUM CALCULATIONSISC02560
C                        IS LESS THAN OR EQUAL TO THE MINIMUM OF I AND  ISC02570
C                        J BELOW. COUNT EACH SOURCE ONLY ONCE. I.E.     ISC02580
C                        IF A SOURCE IS IN MORE THAN ONE COMBINATION    ISC02590
C                        ONLY COUNT IT ONCE FOR THIS CHECK.             ISC02600
C                          I AND J ARE -                                ISC02610
C                          I = (IEND-(NXPNTS+NYPNTS+2*NXWYPT)-K-L)/     ISC02620
C                              (NSEASN*(NXPNTS*NYPNTS+NXWYPT))          ISC02630
C                                                                       ISC02640
C                              IEND = SIZE OF BLANK COMMON (DESIGN SIZE ISC02650
C                                     IS 40000)                         ISC02660
C                             K = NSEASN*(NXPNTS*NYPNTS+NXWYPT)         ISC02670
C                             L = NXPNTS*NYPNTS+NXWYPT                  ISC02680
C                                 IF ISW(4)=0                           ISC02690
C                               = 0                                     ISC02700
C                                 IF ISW(4) IS NON-ZERO                 ISC02710
C                          J = 300                                      ISC02720
C                                                                       ISC02730
C          ISW(12) - (CARD COL. 24)                                     ISC02740
C                    IF SET NON-ZERO THE PROGRAM ASSUMES THE USER IS    ISC02750
C               SPECIFYING THE SET(S) OF 10 RECEPTOR POINTS USED TO     ISC02760
C               CALCULATE MAXIMUMS. THE PROGRAM ASSUMES THE USER HAS    ISC02770
C               INPUT THESE RECEPTOR POINTS INTO THE ARRAYS FOR         ISC02780
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C                SPECIAL DISCRETE POINTS. IF THIS OPTION IS USED      ISC02790
C                AND TAPE INPUT IS ALSO USED, CARD GROUPS 6A AND 7A   ISC02800
C                BELOW ARE READ BY THE PROGRAM AND REPLACE ALL        ISC02810
C                RECEPTOR POINTS ON THE INPUT TAPE. ALSO, IF          ISC02820
C                THE INPUT TAPE CONTAINS TERRAIN ELEVATIONS CARD GROUPISC02830
C                8A IS READ AFTER 7A. MAKE SURE NXHYPT SPECIFIES THE  ISC02840
C                TOTAL NUMBER OF POINTS. IF THE USER INPUTS ONLY 10   ISC02850
C             POINTS SEASONAL AND ANNUAL CALCULATIONS ARE PERFORMED   ISC02860
C             ON THESE 10 POINTS. IF THE USER INPUTS MORE THAN 10     ISC02870
C             POINTS THE PROGRAM ASSUMES THE FIRST 10 ARE FOR SEASON 1ISC02880
C             , THE SECOND 10 ARE FOR SEASON 2, AND THE LAST 10 ARE   ISC02890
C             FOR ANNUAL CALCULATIONS. FOR EXAMPLE IF WE HAVE FOUR    ISC02900
C             SEASONS OF MET DATA TO INPUT AND SEASONAL AND ANNUAL    ISC02910
C             CALCULATIONS ARE PERFORMED ON SEPARATE SETS OF POINTS   ISC02920
C             THEN 50 POINTS MUST BE INPUT. IF ONLY SEASONAL CALCS    ISC02930
C             WERE PERFORMED ONLY 40 POINTS WOULD BE REQUIRED.        ISC02940
C             IF THE LAST OF THE 10 POINTS IN ANY SET HAVE BOTH X     ISC02950
C             AND Y ZERO THEY ARE IGNORED AND LESS THAN 10 ARE        ISC02960
C             ACTUALLY PROCESSED. THE VARIABLE NXHYPT SPECIFIES THE   ISC02970
C             TOTAL NUMBER OF POINTS THE USER HAS PROVIDED.           ISC02980
C          ISW(13) - (CARD COL. 25-26)                                ISC02990
C                OPTIONAL PRINT OUTPUT UNIT. IF LEFT BLANK OR ZERO ISISC03000
C             PUNCHED ALL PRINT OUTPUT GOES TO UNIT 6. IF PUNCHED     ISC03010
C             NON-ZERO ALL PRINT OUTPUT GOES TO THE SPECIFIED UNIT.   ISC03020
C             TWO END OF FILE MARKS ARE WRITTEN AT THE END OF THE     ISC03030
C             ALTERNATE PRINT FILE IF A POSITIVE VALUE IS PUNCHED.    ISC03040
C             IF A NEGATIVE VALUE IS PUNCHED THE END OF FILE MARKS    ISC03050
C             ARE NOT WRITTEN. CAUTION - SOME FORTRAN COMPILERS       ISC03060
C             SPECIFY AN AUTOMATIC WRITE END OF FILE AND REWIND       ISC03070
C             (CLOSE FILES) ON OUTPUT FILES AT THE END OF A PROGRAM   ISC03080
C             RUN.                                                    ISC03090
C          ISW(14) - (CARD COL. 27-28)                                ISC03100
C                OPTIONAL TAPE INPUT UNIT NUMBER. IF BLANK OR 0 THE  ISC03110
C                PROGRAM USES LOGICAL UNIT 2. IF YOU ARE USING A MASSISC03120
C                STORAGE FILE FOR INPUT. YOU MUST PUNCH A NEGATIVE   ISC03130
C                VALUE FOR ISW(14). A POSITIVE VALUE SPECIFIES TAPE. ISC03140
C          ISW(15) - (CARD COL. 29-30)                                ISC03150
C                OPTIONAL TAPE OUTPUT UNIT NUMBER. IF BLANK OR 0 THE ISC03160
C                PROGRAM USES LOGICAL UNIT 3. IF YOU ARE USING A MASSISC03170
C                STORAGE FILE FOR OUTPUT YOU MUST PUNCH A NEGATIVE   ISC03180
C                VALUE FOR ISW(15). A POSITIVE VALUE SPECIFIES TAPE  ISC03190
C          ISW(16) - (CARD COL. 32)                                   ISC03200
C                IF LEFT BLANK OR ZERO IS PUNCHED THE PROGRAM STARTS ISC03210
C                EACH NEW TABLE OF CONCENTRATION OR DEPOSITION ON    ISC03220
C                A NEW PAGE. ALSO, SOME CONTINUATIONS OF THE SAME    ISC03230
C                TABLE ARE STARTED ON A NEW PAGE.                    ISC03240
C                IF PUNCHED NON-ZERO THE PROGRAM ATTEMPTS TO SAVE    ISC03250
C                OUTPUT PAPER BY COMPRESSING THE OUTPUT AND          ISC03260
C                MINIMIZING PAGE EJECTION.                           ISC03270
C          ISW(17) - (CARD COL. 33-34)                                ISC03280
C                OPTIONAL NUMBER OF PRINT LINES PER PAGE. THIS VALUE ISC03290
C                IS INITIALIZED TO 57 LINES PER PAGE. IF YOUR        ISC03300
C                INSTALLATION PRINTER IS SET DIFFERENTLY PUNCH THE   ISC03310
C                CORRECT NUMBER OF LINES PER PAGE.                   ISC03320
C          ISW(18) - (CARD COL 35-36)                                 ISC03330
C                IF LEFT BLANK OR ZERO THE PROGRAM DOES NOT READ     ISC03340
C                CARD GROUP 9. (SEE CARD GROUP 9 - FMT)              ISC03350
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C                  IF PUNCHED NON-ZERO CARD GROUP 9 IS READ BY THE      ISC03360
C                  PROGRAM ONLY IF THERE IS NO TAPE INPUT.              ISC03370
C         ISW(19) - OPTION TO CALCULATE PLUME RISE AS A FUNCTION OF     ISC03380
C                  DOWNWIND DISTANCE FOR STACK SOURCES                  ISC03390
C                  IF = 0 THE PROGRAM CALCULATES FINAL PLUME RISE       ISC03400
C                         INDEPENDENTLY OF DOWNWIND DISTANCE.           ISC03410
C                  IF = 1 THE PLUME RISE CALCULATION IS A FUNCTION      ISC03420
C                         OF DOWNWIND DISTANCE.                         ISC03430
C         ISW(20) - OPTION TO ADD THE BRIGGS (1973) DOWNWASH CORRECTION ISC03440
C                  FOR STACK SOURCES                                    ISC03450
C                  IF = 0 NO DOWNWASH CORRECTION IS MADE                ISC03460
C                  IF = 1 THE BRIGGS (1973) DOWNWASH CORRECTION IS      ISC03470
C                         APPLIED TO ALL STACK SOURCES                  ISC03480
C         ISW(21) - OPTION TO INCLUDE BUOYANCY INDUCED DISPERSION       ISC03490
C                  FOR STACK SOURCES.                                   ISC03500
C                  IF=0 BUOYANCY INDUCED DISPERSION IS INCLUDED.        ISC03510
C                  IF=1 BUOYANCY INDUCED DISPERSION IS NOT INCLUDED.    ISC03520
C         ISW(22) -REGULATORY DEFAULT OPTION SWITCH                     ISC03530
C                  WITH THIS FEATURE VARIOUS MODEL OPTIONS ARE          ISC03540
C                  INTERNALLY OVERRIDDEN WITH EPA RECOMMENED            ISC03550
C                  VALUES. THE FOLLOWING PARAMETERS ARE USED WHEN       ISC03560
C                  THE REG. DEFAULT MODE IS CHOSEN:                     ISC03570
C                  FINAL PLUME RISE                                     ISC03580
C                  BUOYANCY INDUCED DISPERSION                          ISC03590
C                  STACK-TIP DOWNWASH                                   ISC03600
C                  FORCED DEFAULT WIND-PROFILE EXPONENTS                ISC03610
C                      .07,.07,.10,.15,.35,.55 RURAL MODE,              ISC03620
C                      .15,.15,.20,.25,.30,.30 URBAN MODES.             ISC03630
C                  FORCED DEFAULT VALUES FOR VERTICAL POTENTIAL         ISC03640
C                  TEMPERATURE GRADIENTS. (A 0.0, B 0.0, C 0.0          ISC03650
C                  D 0.0, E .02, F .035    K/M)                         ISC03660
C                  DECAY HALF LIFE OF 4 HOURS ASSIGNED IF SO2           ISC03670
C                  IS MODELLED IN AN URBAN MODE.                        ISC03680
C                  IF=0 THE REGULATORY OPTION IS USED.                  ISC03690
C                  IF=1 THE REG. DEFAULT OPTION IS NOT USED.            ISC03700
C         ISW(23) - POLLUTANT INDICATOR SWITCH.                         ISC03710
C                  IF=0 MODEL ASSUMES SO2 IS BEING MODELLED.            ISC03720
C                  IF=1 MODEL ASSUMES OTHER POLLUTANT IS BEING MODELLED.ISC03730
C         ISW(24) - DEBUG OPTION SWITCH                                 ISC03740
C                  IF=0 MODEL ECHOES CARD INPUT LINE BY LINE. THIS      ISC03750
C                  OPTION IS USEFUL FOR INPUT ERROR DEBUGGING.          ISC03760
C                  IF=1 DEBUG OPTION IS NOT USED.                       ISC03770
C                                                                       ISC03780
C-CARD GROUP 3 (10I4)                                                  ISC03790
C      NSOURC - (CARD COL. 1-4)                                        ISC03800
C               NUMBER OF CARD INPUT SOURCES (UNLIMITED)               ISC03810
C               IF SET EQUAL TO A NEGATIVE NUMBER THE PROGRAM WILL     ISC03820
C               CONTINUE TO READ SOURCES UNTIL A NEGATIVE SOURCE       ISC03830
C               IDENTIFICATION NUMBER IS READ.                         ISC03840
C      NGROUP - (CARD COL. 5-8)                                        ISC03850
C               NUMBER OF DIFFERENT SOURCE COMBINATIONS (SUM OF SOURCES) ISC03860
C               TO OUTPUT. IF NGROUP IS LEFT BLANK OR PUNCHED ZERO THEN ISC03870
C               ALL INPUT SOURCES ARE USED TO FORM ANY COMBINED (SUMMED) ISC03880
C               SOURCE OUTPUT AND ANY OUTPUT OF INDIVIDUAL SOURCES. IF  ISC03890
C               NGROUP IS PUNCHED NON-ZERO IT GIVES THE NUMBER OF       ISC03900
C               DIFFERENT SOURCE COMBINATIONS AND THE DETAILS OF THE    ISC03910
C               SOURCE COMBINATIONS ARE READ IN CARD GROUP 4 BELOW.     ISC03920
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C          (MAXIMUM = 20)                                                ISC03930
C       ** WARNING - NGROUP CANNOT BE SET TO A NON-ZERO VALUE UNLESS     ISC03940
C          ONE OR MORE OF THE FOLLOWING CONDITIONS IS MET -              ISC03950
C              A - THE PROGRAM IS USING AN OUTPUT TAPE.                  ISC03960
C              B - THE PROGRAM IS USING AN INPUT TAPE WITH NO            ISC03970
C                  CARD SOURCES, NSOURC = 0.                             ISC03980
C              C - THE TOTAL NUMBER OF INDIVIDUAL SOURCES USED TO        ISC03990
C                  FORM ALL COMBINATIONS DESIRED (COUNT EACH SOURCE      ISC04000
C                  ONLY ONCE) IS LESS THAN OR EQUAL TO THE MINIMUM       ISC04010
C                  OF I AND J -                                          ISC04020
C                     WHERE -                                            ISC04030
C                   ** I = (IEND-(NXPNTS+NYPNTS+2*NXWYPT)-K-L)/          ISC04040
C                          (NSEASN*(NXPNTS*NYPNTS+NXWYPT))               ISC04050
C                                                                        ISC04060
C                          IEND = SIZE OF BLANK COMMON (DESIGN SIZE      ISC04070
C                                 = 40000)                               ISC04080
C                          K = NSEASN*(NXPNTS*NYPNTS+NXWYPT)             ISC04090
C                              IF ISW(8) IS NOT 1 OR ISW(11) = 2         ISC04100
C                            = 0                                         ISC04110
C                              IF ISW(8)=1 AND ISW(11) IS NOT 2          ISC04120
C                          L = NXPNTS*NYPNTS+NXWYPT                      ISC04130
C                              IF ISW(7)=1 AND NSEASN>1                  ISC04140
C                   ** J = 300                                           ISC04150
C                                                                        ISC04160
C                                                                        ISC04170
C     NXPNTS - (CARD COL. 9-12)                                          ISC04180
C              NUMBER OF RECEPTOR POINTS IN THE X AXIS OF THE            ISC04190
C              CALCULATION GRID SYSTEM. THIS PARAMETER IS IGNORED IF     ISC04200
C              TAPE INPUT IS BEING USED.                                 ISC04210
C               IF NXPNTS IS GREATER THAN 2 AND ONLY TWO VALUES OF X ARE ISC04220
C               INPUT IN CARD GROUP 6, THE PROGRAM ASSUMES X(1) IS THE   ISC04230
C               FIRST POINT AND USES X(2) AS AN INCREMENT TO GENERATE    ISC04240
C               POINTS X(2) THROUGH X(NXPNTS).                           ISC04250
C     NYPNTS - (CARD COL. 13-16)                                         ISC04260
C              NUMBER OF RECEPTOR POINTS IN THE Y AXIS OF THE            ISC04270
C              CALCULATION GRID SYSTEM. THIS PARAMETER IS IGNORED IF     ISC04280
C              TAPE INPUT IS BEING USED.                                 ISC04290
C               IF NYPNTS IS GREATER THAN 2 AND ONLY TWO VALUES OF Y ARE ISC04300
C               INPUT IN CARD GROUP 7, THE PROGRAM ASSUMES Y(1) IS THE   ISC04310
C               FIRST POINT AND USES Y(2) AS AN INCREMENT TO GENERATE    ISC04320
C               POINTS Y(2) THROUGH Y(NYPNTS)                            ISC04330
C     NXWYPT - (CARD COL. 17-20) (MUST BE PUNCHED IF ISW(12) > 0)        ISC04340
C              NUMBER OF SPECIAL DISCRETE RECEPTOR CALCULATION           ISC04350
C              POINTS. THESE ARE ADDITIONAL CALCULATION POINTS OR IN     ISC04360
C              LIEU OF THE REGULAR GRID SYSTEM POINTS. ALSO, THIS VALUE  ISC04370
C              SPECIFIES THE NUMBER OF POINTS DESIRED FOR MAXIMUMS UNDER ISC04380
C              ISW(12). SEE ISW(12).                                     ISC04390
C     NSEASN - (CARD COL. 21-24)                                         ISC04400
C              NUMBER OF SEASONS IN INPUT METEOROLOGICAL DATA (FREQ, TA, ISC04410
C              HM, ETC.) (MAX = 4). IF YOU HAVE ANNUAL DATA ONLY SET     ISC04420
C              NSEASN EQUAL TO ONE. (DEFAULT = 1). THIS VALUE IS         ISC04430
C              IGNORED IF YOU ARE USING TAPE INPUT.                      ISC04440
C     NSPEED - (CARD COL. 25-28)                                         ISC04450
C              NUMBER OF WIND SPEED CATEGORIES IN THE INPUT              ISC04460
C              METEOROLOGICAL DATA. (MAX. = 6 AND DEFAULT = 6). THIS     ISC04470
C              PARAMETER IS IGNORED IF YOU ARE USING TAPE INPUT.         ISC04480
C     NSTBLE - (CARD COL. 29-32)                                         ISC04490
C              NUMBER OF PASQUILL STABILITY CATEGORIES IN THE INPUT
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C              METEOROLOGICAL DATA (FREQ, TA, HM, DPDZ, P).(DEFAULT=6)  ISC04500
C              (MAX. = 6). STABILITY CATEGORIES 1 THROUGH 6 FOR THE     ISC04510
C              METEOROLOGICAL DATA CORRESPONDING TO PASQUILL CATEGORIES ISC04520
C              A THROUGH F. ON INPUT IF THERE ARE LESS THAN 6 STABILITY ISC04530
C              CATEGORIES THE PROGRAM ASSUMES THE MISSING CATEGORIES    ISC04540
C              HAVE BEEN COMBINED INTO THE LAST CATEGORY INPUT.         ISC04550
C     NSCTOR - (CARD COL. 33-36)                                        ISC04560
C              NUMBER OF WIND DIRECTION SECTOR CATEGORIES IN THE INPUT  ISC04570
C              FREQUENCY DISTRIBUTION (FREQ). (MAX. = 16) IF LEFT BLANK ISC04580
C              OR ZERO IS PUNCHED THE PROGRAM ASSUMES 16.               ISC04590
C     NOFILE - (CARD COL. 37-40)                                        ISC04600
C              FILE NUMBER OF DATA SET TO BE WRITTEN TO OUTPUT TAPE     ISC04610
C              (ISW(5)=1 OR 3) OR IF NO OUTPUT FILE IS BEING WRITTEN,   ISC04620
C              THE GILE NUMBER OF THE DATA SET TO BE READ FROM TAPE     ISC04630
C              (ISW(5)=2). THIS PARAMETER MUST BE SPECIFIED IF CONDITIONISC04640
C              A OR CONDITION B IS SELECTED UNDER EITHER ISW(11) OR     ISC04650
C              NGROUP. THE USER MUST POSITION TAPES TO THEIR CORRECT    ISC04660
C              FILE NUMBER PRIOR TO EXECUTION AND ISCLT USES NOFILE TO  ISC04670
C              POSITION THE TAPE IT ASSEMBLES REPORTS FROM DURING       ISC04680
C              EXECUTION. NOFILE DOES NOT APPLY TO MASS-STORAGE FILES   ISC04690
C              AS THESE FILES ARE ASSUMED TO BE ONLY ONE FILE. THE      ISC04700
C              DEFAULT FOR NOFILE IS 1.                                 ISC04710
C                                                                       ISC04720
C-CARD GROUP 4 (20I4) AND (13I6) (THIS CARD GROUP IS NOT READ IF NGROUP ISC04730
C     ABOVE IS ZERO OR BLANK. CARD GROUP 4 IS ACTUALLY 2 CARD GROUPS.   ISC04740
C     THE FIRST IS THE ARRAY NOCOMB AND THE SECOND IS THE ARRAY IDSORC. ISC04750
C     NOCOMB - (CARD COL. 1-4,5-8,---,77-80) (1 OR MORE CARDS)          ISC04760
C              ARRAY USED TO SPECIFY THE NUMBER OF SOURCE ID NUMBERS    ISC04770
C              USED TO DEFINE A SOURCE COMBINATION. THE FIRST VALUE     ISC04780
C              PUNCHED ON THIS CARD GIVES THE NUMBER OF VALUES (SOURCE  ISC04790
C              ID NUMBERS) PUNCHED IN THE FIRST PART OF THE ARRAY IDSORCISC04800
C              BELOW FOR THE FIRST SOURCE COMBINATION. (MAX = 20 VALUES)ISC04810
C     IDSORC - (CARD COL. 1-6,7-12,---,73-78) (1 OR MORE CARDS)         ISC04820
C              ARRAY USED TO SPECIFY THE SOURCE ID NUMBERS TO USE IN    ISC04830
C              FORMING THE COMBINED SOURCE OUTPUT AND INDIVIDUAL SOURCE ISC04840
C              OUTPUT. IF A POSITIVE VALUE IS PUNCHED THAT SOURCE IS    ISC04850
C              INCLUDED. IF A NEGATIVE VALUE IS PUNCHED THAT SOURCE IS  ISC04860
C              INCLUDED, AS WELL AS, ALL SOURCES LESS IN ABSOLUTE VALUE ISC04870
C              UP TO AND INCLUDING THE PREVIOUS POSITIVE SOURCE PUNCHED ISC04880
C              IF THERE IS ONE AND IF IT IS PART OF THE SAME GROUP.     ISC04890
C              FOR EXAMPLE ASSUME NGROUP EQUALS 3. ALSO, ASSUME THE     ISC04900
C              VALUES PUNCHED INTO NOCOMB ARE 1, 4, 3 AND THE VALUES    ISC04910
C              PUNCHED INTO IDSORC ARE -32, 7,10,-22,25, -15, 17, 18.   ISC04920
C              THE PROGRAM WILL PRODUCE 3 COMPLETE SETS OF OUTPUT. THE  ISC04930
C              FIRST WILL INCLUDE ALL SOURCES 1 THROUGH 32. THE SECOND  ISC04940
C              WILL INCLUDE SOURCE 7, 10 THROUGH 22 AND 25. THE THIRD   ISC04950
C              OR LAST SET OF OUTPUT WILL INCLUDE SOURCES 1 THROUGH 15  ISC04960
C              AND SOURCES 17 AND 18. NOTE THAT THE SOURCE ID NUMBERS   ISC04970
C              IN EACH GROUP MUST BE IN ASCENDING ABSOLUTE VALUE IN     ISC04980
C              THEIR RESPECTIVE GROUP. ALSO, THESE VALUES ARE THE       ISC04990
C              SOURCE ID NUMBERS YOU HAVE ASSIGNED AND NOT NECESSARILY  ISC05000
C              THE RELATIVE INDEX NUMBER UNLESS ALL SOURCE ID NUMBERS   ISC05010
C              ARE BEING OR HAVE BEEN DEFAULTED. (MAX. NO. OF VALUES    ISC05020
C              IS 200)                                                  ISC05030
C                                                                       ISC05040
C *** NOTE - IF YOU ARE USING TAPE INPUT ONLY CARD GROUPS 6A,7A,8A AND  ISC05050
C            17 THROUGH 17D CAN BE INPUT AND 6A, 7A ARE READ ONLY IF    ISC05060
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C           ISW(12) = 1 AND NXWYPT IS NON-ZERO AND 8A IS READ ONLY IF  ISC05070
C           ISW(12) = 1, NXWYPT IS NON-ZERO AND ISW(4) = 1 OR THE INPUTISC05080
C           TAPE CONTAINS TERRAIN ELEVATIONS.                          ISC05090
C                                                                      ISC05100
C-CARD GROUP 5 (10A4,10A4 FORMAT) (NOT READ IF TAPE INPUT)             ISC05110
C     UNITS - (CARD COL. 1-40 AND 41-80)                               ISC05120
C             THE FIRST 40 CHARACTERS OF UNITS GIVES THE CONCENTRATION ISC05130
C             (DEPOSITION) OUTPUT UNITS LEFT JUSTIFIED. THE SECOND 40  ISC05140
C             CHARACTERS STARTING IN COL. 41 GIVES THE SOURCE INPUT    ISC05150
C             UNITS. IF THE SOURCE IS AN AREA SOURCE THE PROGRAM       ISC05160
C             AUTOMATICALLY APPENDS '/SQUARE METER' ON THE END OF THE  ISC05170
C             SOURCE INPUT UNITS. THIS CARD IS AUTOMATICALLY FILLED IF ISC05180
C             THE PARAMETER TK (CARD GROUP 13) BELOW IS DEFAULTED AND  ISC05190
C             CAN BE LEFT BLANK.                                       ISC05200
C                                                                      ISC05210
C     CARD GROUPS 6,7, AND 8 FOR GRID-TYPE RECEPTORS.                  ISC05220
C-CARD GROUP 6 (8F10.0 FORMAT) (NOT READ IF TAPE INPUT OR NXPNTS = 0)  ISC05230
C     X - ARRAY OF NXPNTS POINTS IN ASCENDING ORDER (MINUS TO POS.)    ISC05240
C         DEFINING THE X AXIS OF THE CALCULATION RECEPTOR GRID SYSTEM  ISC05250
C         (METERS). IF ONLY THE FIRST 2 X VALUES ARE NON-ZERO AND NXPNTSISC05260
C         IS GREATER THAN 2 THEN THE PROGRAM ASSUMES THE FIRST POINT   ISC05270
C         IS THE START OF THE AXIS, THE SECOND POINT IS ACTUALLY AN    ISC05280
C         INCREMENT TO GENERATE THE REMAINING POINTS AND THE PROGRAM   ISC05290
C         THEN GENERATES THE X AXIS INTERNALLY. (CARD COL. 1-10,11-20, ISC05300
C         21-30,---,71-80 ON EACH CARD)                                ISC05310
C                                                                      ISC05320
C-CARD GROUP 7 (8F10.0 FORMAT) (NOT READ IF TAPE INPUT OR NYPNTS = 0)  ISC05330
C     Y - ARRAY OF NYPNTS POINTS IN ASCENDING ORDER (MINUS TO POS.)    ISC05340
C         DEFINING THE Y AXIS OF THE CALCULATION RECEPTOR GRID SYSTEM  ISC05350
C         (METERS OR DEGREES IF POLAR SYSTEM). IF ONLY THE FIRST 2 Y   ISC05360
C         VALUES ARE PUNCHED (NON-ZERO) AND NYPNTS IS GREATER THAN 2   ISC05370
C         THEN THE PROGRAM ASSUMES THE FIRST POINT IS THE START OF THE ISC05380
C         AXIS AND THE SECOND IS ACTUALLY AN INCREMENT USED TO GENERATE ISC05390
C         THE REMAINING POINTS FOR THE AXIS INTERNALLY. (CARD COL. 1-10,ISC05400
C         11-20,---,71-80 ON EACH CARD).                               ISC05410
C                                                                      ISC05420
C-CARD GROUP 8 (8F10.0 FORMAT) (READ ONLY IF ISW(4) = 1)               ISC05430
C     Z - ARRAY OF TERRAIN ELEVATIONS FOR THE CALCULATION GRID SYSTEM  ISC05440
C         (FEET).   THE Z VALUES FOR EACH POINT ON THE X AXIS ARE READ ISC05450
C         FOR EACH VALUE ON THE Y AXIS. START A NEW GROUP OF X AXIS DATAISC05460
C         CARDS FOR EACH Y POINT 1 TO NYPNTS.                          ISC05470
C         (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)                ISC05480
C                                                                      ISC05490
C-CARD GROUPS 6A,7A,AND 8A  FOR DISCRETE RECEPTORS.                    ISC05500
C         FORMAT(3F10.0)                                               ISC05510
C         THESE CARDS ARE ONLY READ IF NXWYPT IS NON-ZERO.             ISC05520
C         1 CARD IS REQUIRED FOR EACH DISCRETE RECEPTOR.               ISC05530
C         NXWYPT CARDS MUST BE INPUT.                                  ISC05540
C         FOR EACH DISCRETE RECEPTOR(EACH CARD) INPUT                  ISC05550
C         X,Y,Z          WHERE:                                        ISC05560
C         X- DISCRETE RECEPTOR X-AXIS LOCATION (METERS)                ISC05570
C         Y- DISCRETE RECEPTOR Y-AXIS LOCATION (METERS)                ISC05580
C         Z- DISCRETE RECEPTOR ELEVATION (FEET)                        ISC05590
C         IF TERRAIN ELEVATIONS ARE NOT TO BE CONSIDERED               ISC05600
C         LEAVE THE LAST ENTRY ON EACH CARD BLANK.                     ISC05610
C                                                                      ISC05620
C-CARD GROUP 9 (20A4 FORMAT ) (NOT READ IF TAPE INPUT OR ISW(18)=0)    ISC05630
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C     FMT - FORTRAN FORMAT OF THE FREQUENCY OF OCCURRENCE OF SPEED AND  ISC05640
C           DIRECTION 'FREQ'. IF ISW(18)=0 THE PROGRAM DEFAULTS THE     ISC05650
C           FORMAT TO (6F10.0) AND CARD GROUP 9 IS NOT READ. IF         ISC05660
C           ISW(18) IS NON-ZERO THE PROGRAM READS THE FORMAT ON THIS    ISC05670
C           DATA CARD INCLUDING LEADING AND ENDING PARENTHESIS AND USES ISC05680
C           THE INPUT FORMAT READ TO READ CARD GROUP 9A.                ISC05690
C-CARD GROUP 9A (FORMAT FMT USED) (THIS CARD GROUP IS NOT READ IF AN    ISC05700
C                INPUT TAPE IS BEING USED)                              ISC05710
C     FREQ - ARRAY OF FREQUENCY OF OCCURRENCES OF WIND SPEED, WIND      ISC05720
C           DIRECTION, STABILITY AND SEASON EXPRESSED AS A PERCENTAGE   ISC05730
C           OR A FRACTION. THE SUM OF ALL VALUES OF FREQ OVER A SINGLE  ISC05740
C           SEASON MUST BE APPROXIMATELY EQUAL TO 100.0 OR 1.0. THESE   ISC05750
C           VALUES ARE READ WITH NSPEED VALUES PER CARD, NSCTOR CARDS   ISC05760
C           PER STABILITY AND NSTBLE GROUPS OF THESE CARDS PER SEASON   ISC05770
C           1 TO NSEASN.                                                ISC05780
C           NSPEED*NSCTOR*NSTBLE*NSEASN VALUES ARE READ.                ISC05790
C                                                                       ISC05800
C-CARD GROUP 10 (6F10.0 FORMAT) (NOT READ IF INPUT TAPE)                ISC05810
C     TA - ARRAY OF AMBIENT AIR TEMPERATURES (DEG K). THERE ARE NSTBLE  ISC05820
C          VALUES READ PER CARD AND NSEASN CARDS READ. IF ANY OF THE    ISC05830
C          SECOND THROUGH NSTBLE VALUES ON A CARD ARE ZERO THE PROGRAM  ISC05840
C          SETS IT EQUAL TO THE LAST NON-ZERO VALUE ENCOUNTERED AS IT   ISC05850
C          SCANS THE DATA CARD FROM LEFT TO RIGHT.                      ISC05860
C          (CARD COL. 1-10,11-20,---,51-60 ON EACH CARD)                ISC05870
C                                                                       ISC05880
C-CARD GROUP 11 (6F10.0 FORMAT) (NOT READ IF INPUT TAPE)                ISC05890
C     HM - ARRAY OF MIXING LAYER HEIGHTS (METERS). THERE ARE NSPEED     ISC05900
C          VALUES READ PER CARD, AND NSTBLE CARDS READ PER SEASON 1 TO  ISC05910
C          NSEASN. IF ANY OF THE SECOND THROUGH NSPEED VALUES ON A CARD ISC05920
C          ARE ZERO, THE PROGRAM SETS IT EQUAL TO THE LAST NON-ZERO     ISC05930
C          VALUE ENCOUNTERED AS IT SCANS THE DATA CARD FROM LEFT TO     ISC05940
C          RIGHT.                                                       ISC05950
C          (CARD COL. 1-10,11-20,---,51-60 ON EACH CARD)                ISC05960
C                                                                       ISC05970
C-CARD GROUP 12 (6F10.0 FORMAT) (NOT READ IF INPUT TAPE)                ISC05980
C     DPDZ - ARRAY OF VERTICAL GRADIENTS OF POTENTIAL TEMP. (DEG/METER).ISC05990
C            THERE ARE NSPEED VALUES READ PER CARD AND NSTBLE CARDS     ISC06000
C            READ. IF ANY VALUE IS INPUT GREATER THAN ZERO THE STABLE   ISC06010
C            PLUME RISE IS USED. IF ANY VALUE IS INPUT LESS THAN ZERO   ISC06020
C            THE ADIABATIC TO UNSTABLE PLUME RISE IS USED. IF A VALUE   ISC06030
C            OF ZERO IS INPUT OR THE VALUE IS LEFT BLANK, THE PROGRAM   ISC06040
C            USES A DEFAULT VALUE. IF THE DEFAULT IS FOR THE FIRST VALUEISC06050
C            ON THE CARD THE DEFAULT VALUE DEPENDS ON STABILITY. IF THE ISC06060
C            STABILITY IS A,B,C OR D A VALUE OF ZERO IS USED. IF THE    ISC06070
C            STABILITY IS E THEN DPDZ = .02, IF F THEN DPDZ = .035. IF  ISC06080
C            THE SECOND THROUGH SIXTH VALUE ON A CARD IS ZERO OR NOT    ISC06090
C            PUNCHED THE PROGRAM SUBSTITUTES THE PREVIOUS VALUE READ    ISC06100
C            FROM THE CARD.                                             ISC06110
C            IF THE REG DEFAULT OPTION IS SELECTED(ISW(22)=0)           ISC06120
C            ANY USER-INPUT VALUES WILL BE REPLACED WITH                ISC06130
C            DEFAULT VALUES.                                            ISC06140
C            (CARD COL. 1-10,11-20,---,51-60 ON EACH CARD)              ISC06150
C                                                                       ISC06160
C-CARD GROUP 13 (5F10.0 FORMAT) (NOT READ IF INPUT TAPE)                ISC06170
C     ROTATE - (CARD COL. 1-10)                                         ISC06180
C              THIS PARAMETER IS USED TO CORRECT FOR ANY DIFFERENCE IN   ISC06190
C              NORTH AS DEFINED BY THE X,Y GRID SYSTEM AND NORTH AS      ISC06200
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C              DEFINED BY THE WEATHER STATION AT WHICH THE WIND          ISC06210
C              DIRECTION DATA WAS RECORDED. THE VALUE OF ROTATE IS       ISC06220
C              SUBTRACTED FROM EACH WIND DIRECTION CATEGORY. ROTATE IS   ISC06230
C              POSITIVE IF THE POSITIVE Y AXIS POINTS TO THE RIGHT OF    ISC06240
C              NORTH AS DEFINED BY THE WEATHER STATION AND NEGATIVE WHENISC06250
C              THE POSITIVE Y AXIS POINTS TO THE LEFT.                   ISC06260
C                  THE PROGRAM ASSUMES THAT THE METEOROLOGICAL DATA       ISC06270
C              (WIND DIRECTION) RECORDED AT THE WEATHER STATION IS       ISC06280
C              APPLICABLE AT THE SOURCE LOCATION. MOST WEATHER STATIONS  ISC06290
C              RECORD DIRECTION RELATIVE TO TRUE NORTH AND MOST GRID     ISC06300
C              SYSTEMS ARE RELATIVE TO TRUE NORTH. HOWEVER, SOME WEATHERISC06310
C              STATIONS RECORD DIRECTION RELATIVE TO MAGNETIC NORTH.     ISC06320
C              ALSO, UTM (UNIVERSAL TRANSVERSE MERCATOR) COORDINATES     ISC06330
C              ARE ORIENTED RELATIVE TO TRUE NORTH AT THE CENTER OF THE  ISC06340
C              UTM ZONE, BUT HAS AN INCREASING POS. OR NEG. DECLINATION  ISC06350
C              AS YOU APPROACH THE ENDS OF THE UTM ZONE. A ONE DEGREE    ISC06360
C              ERROR AT 20 KILOMETERS DOWNWIND RESULTS IN AN ERROR OF    ISC06370
C              349 METERS IN THE LATERAL LOCATION OF THE MAXIMUM.        ISC06380
C                                                                        ISC06390
C      TK - (CARD COL. 11-20)                                            ISC06400
C           MODEL UNITS CONVERSION FACTOR USED TO PRODUCE THE DESIRED    ISC06410
C           OUTPUT CONCENTRATION (DEPOSITION) UNITS. THE DEFAULT FOR     ISC06420
C           CONCENTRATION IS 10**6 MICROGRAMS/GRAM ASSUMING OUTPUT IN    ISC06430
C           MICROGRAMS PER CUBIC METER AND SOURCE UNITS OF GRAMS/SEC. THEISC06440
C           DEFAULT FOR DEPOSITION IS 1.0 ASSUMING OUTPUT IN GRAMS PER   ISC06450
C           SQUARE METER AND SOURCES UNITS OF TOTAL GRAMS. IF THERE ARE  ISC06460
C           ANY VARIATIONS FROM THE ABOVE THEN TK MUST BE INPUT. ALSO, IFISC06470
C           TK IS DEFAULTED THEN THE PARAMETER UNITS ABOVE IS             ISC06480
C           AUTOMATICALLY FILLED AND CAN BE LEFT BLANK.                  ISC06490
C      ZR - (CARD COL. 21-30)                                            ISC06500
C           HEIGHT ABOVE GROUND AT AIRPORT OR WEATHER STATION AT WHICH   ISC06510
C           THE WIND SPEED WAS MEASURED (METERS) (DEFAULT =10.0)         ISC06520
C      G - (CARD COL. 31-40)                                             ISC06530
C          ACCELERATION OF GRAVITY (M/SEC**2) (DEFAULT = 9.8)            ISC06540
C      DECAY - (CARD COL. 41-50)                                         ISC06550
C              = THE WASHOUT COEFFICIENT (PER SEC) FOR PRECIPITATION     ISC06560
C              SCAVENGING.                                               ISC06570
C                  OR                                                    ISC06580
C              = 0.693/T WHERE T IS THE POLLUTANT HALF LIFE FOR PHYSICAL ISC06590
C              OR CHEMICAL REMOVAL(SEC).                                 ISC06600
C                  OR                                                    ISC06610
C              = 0 FOR NO DEPLETION.                                     ISC06620
C      NOTE THAT IF THE REG. DEFAULT OPTION IS CHOSEN AND SO2            ISC06630
C      IS MODELLED IN AN URBAN ENVIRONMENT A DECAY COEFFICIENT           ISC06640
C      OF .0000481 (=.693/3600 SEC) IS ASSIGNED                          ISC06650
C                                                                        ISC06660
C-CARD GROUP 14 (6F10.0 FORMAT) (NOT READ IF TAPE INPUT)                 ISC06670
C      UBAR - ARRAY CONTAINING THE MEDIAN VALUE OF EACH WIND SPEED       ISC06680
C             CATEGORY (M/SEC). IF ANY VALUE ON THIS CARD IS ZERO THE    ISC06690
C             PROGRAM WILL DEFAULT THE VALUE  1.5, 2.5, 4.3, 6.8, 9.5,   ISC06700
C             12.5 M/SEC DEPENDING ON THE RELATIVE POSITION ON THE CARD. ISC06710
C             (CARD COL. 1-10,11-20,---,51-60)                           ISC06720
C                                                                        ISC06730
C-CARD GROUP 15 (8F10.0 FORMAT) (NOT READ IF TAPE INPUT)                 ISC06740
C      THETAP - ARRAY OF WIND DIRECTION SECTOR CATEGORY ANGLES (DEGREES).ISC06750
C           IF THE FIRST TWO VALUES OF THIS ARRAY ARE ZERO THE PROGRAM   ISC06760
C           DEFAULTS TO THE SET OF VALUES 0.0,22.5,45.0,...,337.5 DEG.   ISC06770
C           (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)                ISC06780
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C           (THIS VALUE IS THE DIRECTION FROM WHICH THE WIND IS COMING. ISC06780
C           ALSO, THIS ARRAY IS REFERED TO AS PHI IN THE REMAINDER OF   ISC06790
C           THE PROGRAM)                                                ISC06800
C                                                                       ISC06810
C-CARD GROUP 16 (6F10.0 FORMAT) (NOT READ IF TAPE INPUT)                ISC06820
C     P - ARRAY OF WIND SPEED POWER LAW EXPONENTS. THERE ARE NSPEED     ISC06830
C         VALUES READ PER CARD AND NSTBLE CARDS READ.                   ISC06840
C     IF THE FIRST VALUE OF ANY CARD IS ZERO DEFAULT EXPONENTS          ISC06850
C     ARE USED.  FOR THE URBAN MODE : A .15, B .15, C .20,              ISC06860
C     D .25, E .30, F .30 .  FOR THE RURAL MODE : A .07,B .07           ISC06870
C     C .10, D .15, E .35, F .55   .                                    ISC06880
C                 ALSO, IF ANY OF THE SECOND THROUGH NSPEED VALUES ON ANYISC06890
C         CARD ARE ZERO THE PROGRAM SETS IT EQUAL TO THE LAST NON-ZERO  ISC06900
C         VALUE ENCOUNTERED AS IT SCANS THE CARD FROM LEFT TO RIGHT.    ISC06910
C         IF A NEGATIVE VALUE IS INPUT, THE PROGRAM WILL SUBSTITUTE     ISC06920
C         ZERO IN THE CALCULATIONS.                                     ISC06930
C         IF THE REG. DEFAULT OPTION IS SELECTED(ISW(22)=0)             ISC06940
C         ANY USER-INPUT VALUES WILL BE REPLACED WITH                   ISC06950
C         DEFAULT VALUES.                                               ISC06960
C         (CARD COL. 1-10,11-20,---,51-60 ON EACH CARD)                 ISC06970
C                                                                       ISC06980
C     NOTE THAT IF CARD GROUPS 17 THROUGH 17D ARE TO BE INPUT THEN      ISC06990
C     INCLUDE CARD GROUPS 17 THROUGH 17D FOR SOURCE 1, FOLLOWED BY      ISC07000
C     GROUPS 17 THROUGH 17D FOR SOURCE 2, ETC.                          ISC07010
C-CARD GROUP 17 (I5,3I1,2F10.0,7F7.0,I1,I2) INITIAL CARD FOR EACH       ISC07020
C         SOURCE INPUT VIA DATA CARDS. CARD GROUPS 17 THROUGH 17D ARE   ISC07030
C         ALL INPUT SOURCE RELATED.                                     ISC07040
C     NUMS - (CARD COL. 1-5)                                            ISC07050
C           SOURCE IDENTIFICATION NUMBER. INPUT ALL SOURCES IN          ISC07060
C           ASCENDING ORDER OF THE IDENTIFICATION NUMBER.               ISC07070
C           (DEFAULT = ORDER OF INPUT STARTING AT 1. DO NOT USE DEFAULTISC07080
C           IF TAPE INPUT) (NUMERIC ONLY).                              ISC07090
C           IF A NEGATIVE VALUE IS INPUT IT INDICATES THE END OF THE    ISC07100
C           SOURCE INPUT DATA.                                          ISC07110
C     DISP - (CARD COL. 6) - SOURCE DISPOSITION.                        ISC07120
C          IF = 0 THE PROGRAM ASSUMES THIS IS A NEW SOURCE TO BE        ISC07130
C                 MERGED INTO THE OLD TAPE SOURCES IF PRESENT OR THIS   ISC07140
C                 SOURCE IS TO REPLACE THE OLD TAPE SOURCE HAVING THE   ISC07150
C                 SAME SOURCE IDENTIFICATION NUMBER.                    ISC07160
C          IF = 1 THE PROGRAM ASSUMES THE OLD TAPE SOURCE HAVING THE    ISC07170
C                 SAME SOURCE IDENTIFICATION NUMBER IS TO BE DELETED.   ISC07180
C                 THE REMAINING PARAMETERS ON THIS CARD ARE NOT USED    ISC07190
C                 NOR ARE CARDS 17A THROUGH 17D READ.                   ISC07200
C          IF = 2 THE PROGRAM ASSUMES THE SOURCE STRENGTHS FOR THIS     ISC07210
C                 SOURCE ARE USED TO RESCALE THE CONCENTRATION          ISC07220
C                 (DEPOSITION) CALCULATIONS OF THE OLD TAPE SOURCE      ISC07230
C                 HAVING THE SAME SOURCE IDENTIFICATION NUMBER. THE     ISC07240
C                 REMAINING PARAMETERS ON THIS CARD ARE NOT USED AND    ISC07250
C                 THE PROGRAM READS ONLY CARD GROUP 17D. THIS OPTION    ISC07260
C                 CAN ONLY BE USED IF QFLG IN THE OLD SOURCE DATA       ISC07270
C                 IS ZERO FOR THIS SOURCE. THIS OPTION CAN BE USED      ISC07280
C                 TO CONVERT THE CONCENTRATION (DEP) CALCULATIONS       ISC07290
C                 FROM ONE POLLUTANT TYPE TO ANOTHER WITHOUT HAVING     ISC07300
C                 TO TOTALLY RECALCULATE.                               ISC07310
C     TYPE - (CARD COL. 7)                                              ISC07320
C           SOURCE TYPE WHERE IF 0 A STACK IS ASSUMED, IF = 1 A VOLUME  ISC07330
C           SOURCE IS ASSUMED OR IF = 2 AN AREA SOURCE IS ASSUMED.      ISC07340
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C     QFLG - (CARD COL. 8)                                                  ISC07350
C            SPECIAL FLAG TO INDICATE HOW THE SOURCE STRENGTH VARIES.       ISC07360
C            IF = 0 THEN SOURCE STRENGTH VARIES WITH SEASON ONLY AND        ISC07370
C                   NSEASN VALUES ARE INPUT ON ONE DATA CARD UNDER          ISC07380
C                   CARD GROUP 170 BELOW.                                   ISC07390
C            IF = 1 THEN SOURCE STRENGTH VARIES WITH SEASON AND             ISC07400
C                   STABILITY. THERE ARE NSTBLE VALUES READ PER CARD        ISC07410
C                   AND NSEASN CARDS READ UNDER CARD GROUP 170 BELOW.       ISC07420
C            IF = 2 THEN SOURCE STRENGTH VARIES WITH SPEED AND              ISC07430
C                   SEASON. THERE ARE NSPEED VALUES READ PER CARD           ISC07440
C                   AND NSEASN CARDS READ UNDER CARD GROUP 170 BELOW.       ISC07450
C            IF = 3 THEN SOURCE STRENGTH VARIES WITH SEASON, STABILITY      ISC07460
C                   AND SPEED. THERE ARE NSPEED VALUES READ PER CARD        ISC07470
C                   AND NSTBLE CARDS READ FOR EACH SEASON 1 TO NSEASN       ISC07480
C                   UNDER CARD GROUP 170 BELOW.                             ISC07490
C     DX - X COORDINATE OF THE SOURCE (METERS) (CARTESIAN COORDINATES       ISC07500
C          ONLY) (CARD COL. 9-18). IF THE SOURCE IS AN AREA SOURCE          ISC07510
C          ENTER THE X COORDINATE OF THE SOUTH-WEST CORNER                  ISC07520
C     DY - Y COORDINATE OF THE SOURCE (METERS) (CARTESIAN COORDINATES       ISC07530
C          ONLY) (CARD COL. 19-28). IF THE SOURCE IS AN AREA SOURCE         ISC07540
C          ENTER THE Y COORDINATE OF THE SOUTH-WEST CORNER                  ISC07550
C     H - HEIGHT ABOVE GROUND OF THE EMISSION (METERS) (CARD COL. 29-35)    ISC07560
C         (IF THIS IS A VOLUME SOURCE H IS THE HEIGHT TO THE CENTER OF      ISC07570
C         THE SOURCE).                                                      ISC07580
C     ZS - ELEVATION OF GROUND AT SOURCE SITE (METERS) (CARD COL. 36-42)    ISC07590
C          (NOT USED IF ISW(4) = 0)                                         ISC07600
C                                                                           ISC07610
C     - TYPE 0 SOURCES -                                                    ISC07620
C     TS - STACK GAS EXIT TEMP. (DEG K). IF TS IS LESS THAN OR EQUAL TO     ISC07630
C          ZERO THE ABSOLUTE VALUE IS ADDED TO THE AMBIENT AIR TEMP. TO     ISC07640
C          FORM THE STACK GAS EXIT TEMP. (CARD COL. 43-49)                  ISC07650
C     VEL - STACK GAS EXIT VELOCITY (M/SEC) (CARD COL. 50-56)               ISC07660
C     D - INTERNAL STACK DIAMETER (METERS) (CARD COL. 57-63)                ISC07670
C     HB - HEIGHT ABOVE GROUND (METERS) OF THE TALLEST BUILDING WITHIN      ISC07680
C          2*HB OF THE STACK. (CARD COL. 64-70)                             ISC07690
C     BW - WIDTH (METERS) OF THE TALLEST BUILDING WITHIN 2*HB OF THE        ISC07700
C          STACK. IF THE BUILDING IS NOT SQUARE INPUT THE WIDTH OF A        ISC07710
C          SQUARE BUILDING OF EQUAL AREA. (CARD COL. 71-77)                 ISC07720
C     WAKE - WAKE EFFECTS FLAG. IF THE EFFECTIVE BUILDING WIDTH TO          ISC07730
C            HEIGHT RATIO IS GREATER THAN 5 AND WAKE IS 0 OR BLANK          ISC07740
C            THE PROGRAM USES THE EQUATION OF LATERAL VIRTUAL DISTANCE      ISC07750
C            THAT WILL PRODUCE THE UPPER BOUND OF THE CONCENTRATION         ISC07760
C            (DEPOSITION) FOR THIS SOURCE. IF THE RATIO IS GREATER THAN     ISC07770
C            5 AND WAKE IS SET EQUAL TO 1 THE PROGRAM USES THE EQUATION     ISC07780
C            OF LATERAL VIRTUAL DISTANCE THAT WILL PRODUCE THE LOWER        ISC07790
C            BOUND OF THE CONCENTRATION (DEPOSITION) FOR THIS SOURCE.       ISC07800
C            (CARD COL. 78)                                                 ISC07810
C     - TYPE 1 SOURCES -                                                    ISC07820
C     SIGYO - STANDARD DEVIATION OF THE CROSSWIND VOLUME SOURCE             ISC07830
C             DISTRIBUTION (METERS). (CARD COL. 43-49)                      ISC07840
C     SIGZO - STANDARD DEVIATION OF THE VERTICAL VOLUME SOURCE              ISC07850
C             DISTRIBUTION (METERS). (CARD COL. 50-56)                      ISC07860
C     - TYPE 2 SOURCES -                                                    ISC07870
C     XO - WIDTH OF THE AREA SOURCE (METERS) (CARD COL. 43-49)               ISC07880
C     - ALL SOURCE TYPES -                                                  ISC07890
C     NVS - NUMBER OF PARTICLE SIZE CATEGORIES FOR GRAVITATIONAL            ISC07900
C           DEPOSITION OR CONCENTRATION WITH DEPLETION DUE TO               ISC07910
C           GRAVITATIONAL DEPOSITION (MAX = 20).
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C           (CARD COL. 79-80)                                          ISC07920
C                                                                      ISC07930
C-CARD GROUP 17A (8F10.0 FORMAT) (NOT READ IF NVS ON CARD GROUP 17 IS  ISC07940
C     ZERO.                                                            ISC07950
C     VS - ARRAY OF SETTLING VELOCITIES FOR THE PARTICLE SIZE CATORIES ISC07960
C          (M/SEC) (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)       ISC07970
C                                                                      ISC07980
C-CARD GROUP 17B (8F10.0 FORMAT) (NOT READ IF NVS ON CARD GROUP 17 IS  ISC07990
C     ZERO                                                             ISC08000
C     FRQ - ARRAY OF MASS FRACTION OF PARTICULATES FOR THE PARTICLE SIZEISC08010
C           CATEGORIES (FRACTION).                                     ISC08020
C           (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)              ISC08030
C                                                                      ISC08040
C-CARD GROUP 17C (8F10.0 FORMAT) (NOT READ IF NVS ON CARD GROUP 17 IS  ISC08050
C     ZERO                                                             ISC08060
C     GAMMA - ARRAY OF SURFACE REFLECTION COEFFICIENTS FOR THE PARTICLE ISC08070
C             SIZE CATEGORIES. A VALUE OF 0 IS NO REFLECTION UP TO 1 AS ISC08080
C             COMPLETE REFLECTION. (FRACTION 0 TO 1)                   ISC08090
C             (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)            ISC08100
C                                                                      ISC08110
C-CARD GROUP 17D (6F10.0 FORMAT)                                       ISC08120
C     Q - (CARD COL. 1-10,11-20,---,51-60 OR AS MANY AS ARE READ PER   ISC08130
C         DATA CARD)                                                   ISC08140
C         ARRAY OF SOURCE EMISSION STRENGTHS. SEE QFLG ABOVE FOR THE   ISC08150
C         INPUT ORDER. NO DEFAULT VALUES OR LOGIC IS PROVIDED FOR      ISC08160
C         SOURCE STRENGTHS BECAUSE ZERO IS A VALID SOURCE STRENGTH.    ISC08170
C                THE UNITS OF Q ARE...                                 ISC08180
C           SOURCE TYPE              -  CALCULATING -                  ISC08190
C                            CONCENTRATION            DEPOSITION      ISC08200
C        STACK OR VOLUME     MASS PER UNIT TIME        TOTAL MASS     ISC08210
C            AREA            MASS PER UNIT TIME PER    TOTAL MASS PER ISC08220
C                                 UNIT AREA                UNIT AREA  ISC08230
C         IF TK ABOVE IS DEFAULTED THEN THE PROGRAMS Q IS IN GRAMS/SEC ISC08240
C         FOR CONCENTRATION AND GRAMS FOR TOTAL DEPOSITION.            ISC08250
C                                                                      ISC08260
C *** REPEAT CARD GROUPS 17 TO 17D FOR EACH SOURCE INPUT               ISC08270
C                                                                      ISC08280
C*************** END OF INPUT DATA ************************************ISC08290
      WRITE (6,1234)                                                   ISC08300
 1234 FORMAT ('1',21X,'ISCLT (VERSION 86170) '/                        ISC08310
     1 22X,'AN AIR QUALITY DISPERSION MODEL IN'/                       ISC08320
     2 22X,'SECTION 2.  NON-GUIDELINE MODELS.'/                        ISC08330
     3 22X,'IN UNAMAP APRIL,1986.'/                                    ISC08340
     4 22X,'SOURCE: UNAMAP FILE ON EPA''S UNIVAC 1110, RTP, NC.')      ISC08350
C                                                                      ISC08360
C     CARD READER IS IUNT, PRINTER IS JUNT                             ISC08370
      IUNT = 5                                                         ISC08380
      JUNT = 6                                                         ISC08390
C     INPUT TAPE IS UNIT MUNT, OUTPUT IS NUNT                          ISC08400
      MUNT = 2                                                         ISC08410
      NUNT = 3                                                         ISC08420
C     IEND IS TOTAL AMOUNT OF STORAGE IN ARRAY CORE                    ISC08430
      IEND = 40000                                                     ISC08440
C     READ RUN TITLE                                                   ISC08450
C***  CARD GROUP 1                                                     ISC08460
      READ (IUNT,9001) TITLE                                           ISC08470
C     READ PROGRAM OPTIONS                                             ISC08480
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C***  CARD GROUP 2                                                          ISC08490
      READ (IUNT,9006) JSW                                                  ISC08500
      IF(JSW(24).EQ.0) THEN                                                 ISC08510
      WRITE(JUNT,9506) JSW                                                  ISC08520
      ENDIF                                                                 ISC08530
      IF (JSW(14) .NE. 0) MUNT = IABS(JSW(14))                              ISC08540
      IF (JSW(15) .NE. 0) NUNT = IABS(JSW(15))                              ISC08550
   10 IF (JSW(5) .LE. 1) GO TO 70                                           ISC08560
      READ (MUNT,END=10) (MSOR(I),I=1,72)                                   ISC08570
      DO 20 I=2,52                                                          ISC08580
   20 NSOR(I) = MSOR(I)                                                     ISC08590
      J1 = ISW(9)                                                           ISC08600
      DO 30 I=5,24                                                          ISC08610
   30 ISW(I) = JSW(I)                                                       ISC08620
C     SET REGULATORY OPTION FOR TAPE INPUT                                  ISC08630
      IF(ISW(22).NE.0) GO TO 35                                             ISC08640
      ISW(19)=0                                                             ISC08650
      ISW(20)=1                                                             ISC08660
      ISW(21)=0                                                             ISC08670
   35 CONTINUE                                                              ISC08680
      IF (ISW(9) .EQ. 0) ISW(9) = J1                                        ISC08690
      IF (ISW(11) .GT. 0.AND.ISW(10) .EQ. 0) ISW(10) = 1                    ISC08700
      IF (ISW(12) .GT. 0.AND.ISW(10) .EQ. 0) ISW(10) = 1                    ISC08710
      DO 40 I=1,10                                                          ISC08720
      IF (TITLE(I) .NE. J5) GO TO 60                                        ISC08730
   40 CONTINUE                                                              ISC08740
      DO 50 I=53,72                                                         ISC08750
   50 NSOR(I) = MSOR(I)                                                     ISC08760
   60 CONTINUE                                                              ISC08770
C     READ NO. OF CARD INPUT SOURCES WITH TAPE INPUT                        ISC08780
C***  CARD GROUP 3 (WITH TAPE INPUT)                                        ISC08790
      READ (IUNT,9004) NSOURC,NGROUP,NXWY,NOFILE                            ISC08800
      IF(ISW(24).EQ.0) THEN                                                 ISC08810
      WRITE(JUNT,9504) NSOURC,NGROUP,NXWY,NOFILE                            ISC08820
      ENDIF                                                                 ISC08830
      GO TO 90                                                              ISC08840
   70 CONTINUE                                                              ISC08850
      DO 80  I=1,24                                                         ISC08860
   80 ISW(I) = JSW(I)                                                       ISC08870
C     SET REGULATORY OPTION                                                 ISC08880
      IF(ISW(22).NE.0) GO TO 85                                             ISC08890
      ISW(19)=0                                                             ISC08900
      ISW(20)=1                                                             ISC08910
      ISW(21)=0                                                             ISC08920
   85 CONTINUE                                                              ISC08930
C     READ DATA SIZE PARAMETERS - NO TAPE INPUT                             ISC08940
C***  CARD GROUP 3 (NO TAPE INPUT)                                          ISC08950
      READ (IUNT,9002) NSOURC,NGROUP,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,   ISC08960
     1NSTBLE,NSCTOR,NOFILE                                                  ISC08970
      IF(ISW(24).EQ.0) THEN                                                 ISC08980
      WRITE(JUNT,9502) NSOURC,NGROUP,NXPNTS,NYPNTS,NXWYPT,NSEASN,           ISC08990
     1  NSPEED,NSTBLE,NSCTOR,NOFILE                                         ISC09000
      ENDIF                                                                 ISC09010
   90 CONTINUE                                                              ISC09020
      IF (NOFILE .LE. 0) NOFILE = 1                                         ISC09030
      LINE = 0                                                              ISC09040
      IF (ISW(13) .LT. 0) LINE = 1                                          ISC09050
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      ISW(13) = IABS(ISW(13))
C     DEFAULT SIZE PARAMETERS
      IF (NSEASN .LE. 0) NSEASN = 1
      IF (NSPEED .LE. 0) NSPEED = 6
      IF (NSCTOR .LE. 0) NSCTOR = 16
      DO 100  I=1,6
  100 ISTBLE(I) = I
      IF (ISW(9) .EQ. 0) ISW(9) = 3
      IF(ISW(9) .EQ. 3 .OR. ISW(9) .EQ. 4) GOTO 120
      IF (ISW(9) .EQ. 2) GO TO 110
C     URBAN MODE 1
      ISTBLE(5) = 4
      ISTBLE(6) = 4
      GO TO 130
  110 CONTINUE
C     URBAN MODE 2
      ISTBLE(2) = 1
      ISTBLE(3) = 2
      ISTBLE(4) = 3
      ISTBLE(5) = 4
      ISTBLE(6) = 4
      GO TO 130
C     RURAL MODE 1 AND URBAN MODE 3
  120 CONTINUE
  130 IF (NSTBLE .LE. 0) NSTBLE = 6
C***  CARD GROUP 4
      IF (NGROUP .LE. 0) GO TO 150
      READ (IUNT,9002) (NOCOMB(I),I=1,NGROUP)
      IF(ISW(24).EQ.0) THEN
      WRITE(JUNT,9502) (NOCOMB(I),I=1,NGROUP)
      ENDIF
      J = 0
      DO 140 I=1,NGROUP
  140 J = J+NOCOMB(I)
      READ (IUNT,9005) (IDSORC(I),I=1,J)
      IF(ISW(24).EQ.0) THEN
      WRITE(JUNT,9505) (IDSORC(I),I=1,J)
      ENDIF
  150 CONTINUE
      IF (ISW(5) .GE. 2) GO TO 160
C     READ CONCENTRATION (DEPOSITION) OUTPUT UNITS AND SOURCE STRENGTH
C     INPUT UNITS
C***  CARD GROUP 5 (NOT READ IF TAPE INPUT)
      READ (IUNT,9001) UNITS
      IF(ISW(24).EQ.0) THEN
      WRITE(JUNT,9501) UNITS
      ENDIF
  160 CONTINUE
C     REG. DEFAULT OPTION SWITCHES
      IF (ISW(7) .LE. 0) ISW(7) = 3
      IF (ISW(8) .LE. 0) ISW(8) = 3
      DO 170 I=1,3
      IF (ISW(I) .LE. 0) ISW(I) = 1
  170 CONTINUE
      IF (ISW(13) .GT. 0) JUNT = ISW(13)
      NLINES = 57
      IF (ISW(17) .GT. 0) NLINES = ISW(17)
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ISC09060
ISC09070
ISC09080
ISC09090
ISC09100
ISC09110
ISC09120
ISC09130
ISC09140
ISC09150
ISC09160
ISC09170
ISC09180
ISC09190
ISC09200
ISC09210
ISC09220
ISC09230
ISC09240
ISC09250
ISC09260
ISC09270
ISC09280
ISC09290
ISC09300
ISC09310
ISC09320
ISC09330
ISC09340
ISC09350
ISC09360
ISC09370
ISC09380
ISC09390
ISC09400
ISC09410
ISC09420
ISC09430
ISC09440
ISC09450
ISC09460
ISC09470
ISC09480
ISC09490
ISC09500
ISC09510
ISC09520
ISC09530
ISC09540
ISC09550
ISC09560
ISC09570
ISC09580
ISC09590
ISC09600
ISC09610
ISC09620
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      LINE = 100                                                        ISC09630
C     CALCULATE STARTING LOCATION OF EACH ARRAY IN BLANK COMMON         ISC09640
C                                                                       ISC09650
C     STARTING LOCATION OF X AXIS INCLUDING ANY SPECIAL CALCULATION     ISC09660
C     RECEPTOR POINTS                                                   ISC09670
      J1 = 1                                                            ISC09680
C     STARTING LOCATION OF Y AXIS INCLUDING ANY SPECIAL CALCULATION     ISC09690
C     RECEPTOR POINTS                                                   ISC09700
      J2 = J1+NXPNTS+NXWYPT                                             ISC09710
C     STARTING LOCATION OF Z ELEVATION POINTS FOR GRID AND SPECIAL      ISC09720
C     POINTS                                                            ISC09730
      J3 = J2+NYPNTS+NXWYPT                                             ISC09740
C     STARTING LOCATION OF THE CONCENTRATION (DEPOSITION) ARRAYS        ISC09750
      NXXYY = NXPNTS*NYPNTS                                             ISC09760
      NXXYYP = NXXYY+NXWYPT                                             ISC09770
      J4 = J3                                                           ISC09780
      IF (ISW(4) .NE. 0) J4 = J3+NXXYYP                                 ISC09790
      J5 = J4+NSEASN*NXXYYP-1                                           ISC09800
      IF (ISW(8) .NE. 1.OR.ISW(11) .EQ. 2) J5 = J5+NSEASN*NXXYYP        ISC09810
C     DETERMINE IF ENOUGH STORAGE                                       ISC09820
      IF (J5 .LE. IEND) GO TO 180                                       ISC09830
      WRITE (JUNT,9003) IEND,J5                                         ISC09840
      GO TO 190                                                         ISC09850
  180 CONTINUE                                                          ISC09860
      IF (ISW(5) .EQ. 1.OR.ISW(5) .EQ. 3) WRITE (NUNT) (NSOR(I),I=1,72) ISC09870
C     EXECUTE LONG TERM MODEL                                           ISC09880
      CALL MODEL(CORE(J1),CORE(J2),CORE(J3),CORE(J4))                   ISC09890
  190 STOP                                                              ISC09900
 9001 FORMAT (20A4)                                                     ISC09910
 9002 FORMAT (20I4)                                                     ISC09920
 9003 FORMAT (////22H ERROR - MAX STORAGE =,I6,17H, USER REQUESTED ,I6,2ISC09930
     18H, REDUCE NO. OF CALC. POINTS///)                                ISC09940
 9004 FORMAT (2I4,8X,I4,16X,I4)                                         ISC09950
 9005 FORMAT (13I6)                                                     ISC09960
 9006 FORMAT (24I2)                                                     ISC09970
 9501 FORMAT(1X,20A4)                                                   ISC09980
 9502 FORMAT(1X,20I4)                                                   ISC09990
 9504 FORMAT(1X,2I4,8X,I4,16X,I4)                                       ISC10000
 9505 FORMAT(1X,13I6)                                                   ISC10010
 9506 FORMAT(1X,24I2)                                                   ISC10020
      END                                                               ISC10030
C                                                                       ISC10040
      SUBROUTINE MODEL(X,Y,Z,CON)                                       ISC10050
C               SUBROUTINE MODEL (VERSION 5300), PART OF ISCLT.         ISC10060
      COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,NSTBLE,    ISC10070
     1NSCTOR,ISW(24),UNITS(20),TITLE(20),NOFILE                         ISC10080
      COMMON /MET/ FREQ(6,16,24),TA(6,4),HM(6,6,4),DPDZ(6,6),UBAR(6),   ISC10090
     1P(6,6),PHI(16),ROTATE,G,ZR,DECAY,TK                               ISC10100
C     NORMALLY THE ARRAY FREQ IN COMMON /MET/ WOULD BE DIMENSIONED 6,6, ISC10110
C     6,4. HOWEVER, SOME FORTRAN COMPILERS LIMIT THE MAXIMUM NUMBER OF  ISC10120
C     DIMENSIONS TO 3, SO THERE ARE ACTUALLY 2 DIMENSIONS IN THE THIRD  ISC10130
C     SET TO 24.                                                        ISC10140
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES, ISC10150
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC10160
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC10170
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY                             ISC10180
      COMMON /DIST/ XB,YB,XYP,INN,TR,TRI,ARG,RP,RPI                     ISC10190
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      COMMON /VERT/ SIGZI,SIGZ,HMP,HP,V,VSROU,BBAR                      ISC10200
C     DATA CARD SOURCE INPUT DATA                                       ISC10210
      COMMON /SORC1/ NUMS1,TYPE1,DX1,DY1,H1,ZS1,TS1,VEL1,D1,HB1,BW1,BL1,ISC10220
     1NVS1,VS1(20),FRQ1(20),GAMMA1(20),Q1(6,6,4),QFLG1,WAKE1,DISP       ISC10230
C     TAPE SOURCE INPUT DATA                                            ISC10240
      COMMON /SORC2/ NUMS2,TYPE2,DX2,DY2,H2,ZS2,TS2,VEL2,D2,HB2,BW2,BL2,ISC10250
     1NVS2,VS2(20),FRQ2(20),GAMMA2(20),Q2(6,6,4),QFLG2,WAKE2           ISC10260
C     SOURCE FOR WHICH CONCENTRATION (DEPOSITION) IS CURRENTLY BEING    ISC10270
C     CALCULATED.                                                       ISC10280
      COMMON /SORC/ NUMS,TYPE,DX,DY,H,ZS,TS,VEL,D,HB,BW,BL,NVS,VS(20),FRISC10290
     1Q(20),GAMMA(20),Q(6,6,4),QFLG,WAKE                               ISC10300
C     ARRAYS FOR STORAGE OF CONSTANTS USED TO CALCULATE SIGY, SIGZ, XY, ISC10310
C     XZ                                                                ISC10320
      COMMON /FUNCS/ AS(38),BS(38),PS(6),QS(6),CS(6),DS(6),ASI(38),BSI(3ISC10330
     18),IA(7),JA(6),DST(33),IDP                                       ISC10340
      DIMENSION X(1),Y(1),Z(1),CON(1),NSOR1(1),NSOR2(1),NSOR(1),        ISC10350
     1MSG1(3,4),U995(6),UNIT(20),UNIS(20),STBLE(2),      DELH(6,6,16),  ISC10360
     2XY(6),FFQ(1),UBHI(6,6),PHS(16),PHC(16),MSG2(6,2)                 ISC10370
     3,FMT(20),HBRIG(6,6)                                              ISC10380
      DIMENSION PPR(6),PPU(6)                                           ISC10390
C     THE FIRST DIMENSION OF THE ARRAY CON ABOVE CONTAINS NXPNTS*NYPNTS+ISC10400
C     NXNYPT POINTS. THE VARIABLE IS SET UP THIS WAY TO ACCOMMODATE ANY ISC10410
C     COMBINATION OF GRID SYSTEM POINTS AND SPECIAL DISCRETE POINTS.    ISC10420
      EQUIVALENCE (NSOR1(1),NUMS1),(NSOR2(1),NUMS2),(NSOR(1),NUMS)      ISC10430
     1,(FFQ(1),FREQ(1,1,1)),(SIGYO,TS),(SIGZO,VEL),(TS1,X0P)           ISC10440
     2,(SIGY01,TS1),(FMT(1),GAMMA(1))                                  ISC10450
      INTEGER TYPE1,TYPE2,TYPE,TITLE,UNITS,DISP,QFLG,UNIT,UNIS          ISC10460
     1,QFLG1,QFLG2,QFLGS,WAKE,FMT,WAKE1,WAKE2                          ISC10470
      DATA MSG1/4HURBA,4HN MO,4HDE 1,4HURBA,4HN MO,4HDE 2,4HRURA,4HL MO,ISC10480
     14HDE  ,4HURBA,4HN MO,4HDE 3/                                     ISC10490
C     DEFAULT WIND SPEEDS                                               ISC10500
      DATA UBRS/ 1.5,2.5,4.3,6.8,9.5,12.5/                              ISC10510
C     DEFAULT UNITS                                                     ISC10520
      DATA UNIT/4H MIC,4HROGR,4HAMS ,4HPER ,4HCUBI,4HC ME,4HTER ,3*1H , ISC10530
     14H GRA,4HMS P,4HER S,4HEC  ,6*1H /                               ISC10540
      DATA UNIS/4H GRA,4HMS P,4HER S,4HQUAR,4HE ME,4HTER ,4*1H ,        ISC10550
     14H GRA,4HMS  ,8*1H /                                             ISC10560
C     DEFAULT VERTICAL POTENTIAL TEMPERATURE GRADIENTS                  ISC10570
      DATA STBLE/0.02,0.035/                                            ISC10580
C     DEFAULT WIND PROFILE POWER LAW EXPONENTS (URBAN OR RURAL)         ISC10590
      DATA PPR/.07,.07,.10,.15,.35,.55/                                 ISC10600
      DATA PPU/.15,.15,.20,.25,.30,.30/                                 ISC10610
      DATA MSG7/1H ,4H   D,4HISTA,3HNCE,2*1H ,4H  RA,3HNGE,4HAZIM,4HUTH ISC10620
     1,4HBEAR,3HING/                                                   ISC10630
      DATA MSG8/1HX,1HY/                                                ISC10640
      DATA MSG9/4HMETE,2HRS,4HDEGR,3HEES/                               ISC10650
      DATA MSG2/4H AXI,4HS GR,4HID S,4HYSTE,4HM PO,4HINTS,4H SPE,4HCIAL,ISC10660
     14H DIS,4HCRET,4HE PO,4HINTS/                                     ISC10670
      DATA RADIAN/.01745329/                                            ISC10680
      DATA AS/ 122.8,                                                   ISC10690
     1        158.08,170.22,179.52,217.41,258.89,346.75,453.85,5000.0,  ISC10700
     190.673,98.483,109.3,61.141,34.459,32.093,32.093,33.504,36.65,44.05ISC10710
     2 3,24.26,                                                        ISC10720
     2  23.331,21.628,21.628,22.534,24.703,26.97,35.42,47.618,15.209,14.ISC10730
     3457,13.953,13.953,14.823,16.187,17.836,22.651,27.074,34.219/     ISC10740
      DATA BS/ .9447, *                                                 ISC10750
     1        1.0542,1.0932,1.1262,1.2644,1.4094,1.7283,2.1166,0.0,.9319ISC10760
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     10,.98332,1.0971,.91465,.86974,.81066,.64403,.60486,.56589,.51179, ISC10770
                                                                        ISC10780
     2 .8366,                                                           ISC10790
     2.81956,.7566,.63077,.57154,.50527,.46713,.37615,.29592,.81558,    ISC10800
     3.78407,.68465,.63227,.54503,.4649,.41507,.32681,.27436,.21716/    ISC10810
      DATA PS/209.14,154.46,103.26,68.26,51.06,33.92/                   ISC10820
      DATA QS/.89,.902,.917,.919,.921,.919/                             ISC10830
      DATA CS/24.167,18.333,12.5,8.333,6.25,4.1667/                     ISC10840
      DATA DS/2.5334,1.8096,1.0857,.72382,.54287,.36191/                ISC10850
      DATA IA/1,9,11,12,17,25,34/                                       ISC10860
      DATA JA/1,10,13,14,20,29/                                         ISC10870
      DATA DST/ 0.10,                                                   ISC10880
     1         0.15,0.2,0.25,0.3,0.4,0.5,3.11,0.2,0.4,0.1,0.3,1.0,3.0,10ISC10890
     1 .0,30.0,      .10,                                              ISC10900
     1        0.3,1.0,2.0,4.0,10.0,20.0,40.0,0.2,0.7,1.0,2.0,3.0,7.0,15.ISC10910
     20,30.0,60.0/                                                      ISC10920
      DATA ICONT/1H-,2*1H ,4H(CON,3HT.),1H-/,NT1/1/,NT2/1/,NT3/1/       ISC10930
      DATA FMT/3H(6F,4H10.0,1H),17*1H /                                 ISC10940
      NUMSL = 0                                                         ISC10950
      INDFL = LINE                                                      ISC10960
      DO 10 I=1,6                                                       ISC10970
      PS(I) = 1.0/PS(I)                                                 ISC10980
   10 QS(I) = 1.0/QS(I)                                                 ISC10990
      DO 20 I=1,38                                                      ISC11000
      ASI(I) = 1.0/AS(I)                                                ISC11010
      IF (BS(I) .GT. 0.0) BSI(I) = 1.0/BS(I)                            ISC11020
   20 CONTINUE                                                          ISC11030
C     TOTAL X POINTS                                                   ISC11040
      NXPS = NXPNTS+NXWYPT                                              ISC11050
C     TOTAL Y POINTS                                                   ISC11060
      NYPS = NYPNTS+NXWYPT                                              ISC11070
C     NMET IS THE LENGTH OF COMMON /MET/                               ISC11080
      NMET=2571                                                         ISC11090
C     NSO IS THE LENGTH OF COMMON /SORC/                               ISC11100
      NSO = 219                                                         ISC11110
C     COUNTERS FOR WARNING MESSAGES                                    ISC11120
      IPR1 = 0                                                          ISC11130
C                                                                       ISC11140
      NT4 = 1                                                           ISC11150
C     INPUT CALCULATION POINTS AND MET DATA                            ISC11160
C*************************************************************************ISC11170
      IF (ISW(5) .GE. 2) GO TO 210                                      ISC11180
C     INPUT X FOR GRID RECEPTORS.                                      ISC11190
      IF (NXPNTS .LE. 0) GO TO 60                                       ISC11200
C***  CARD GROUP 6 (NOT READ IF TAPE INPUT)                            ISC11210
      X(3) = 0.0                                                        ISC11220
      X(4) = 0.0                                                        ISC11230
      J = 8                                                             ISC11240
      IF (J .GT. NXPNTS) J = NXPNTS                                     ISC11250
      READ (IUNT,9002) (X(I),I=1,J)                                     ISC11260
      IF(ISW(24).EQ.0) THEN                                             ISC11270
      WRITE(JUNT,9502) (X(I),I=1,J)                                     ISC11280
      ENDIF                                                             ISC11290
      IF (ABS(X(3))+ABS(X(4))) 50,30,50                                 ISC11300
   30 IF (NXPNTS .LT. 3) GO TO 60                                       ISC11310
      A1 = X(2)                                                         ISC11320
      DO 40  I=2,NXPNTS                                                 ISC11330
   40 X(I) = X(I-1)+A1
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      GO TO 60                                                          ISC11340
   50 IF (NXPNTS .LE. 8) GO TO 60                                       ISC11350
C***  CARD GROUP 6 (CONTINUED)                                          ISC11360
      READ (IUNT,9002) (X(I),I=9,NXPNTS)                               ISC11370
      IF(ISW(24).EQ.0) THEN                                             ISC11380
      WRITE(JUNT,9502) (X(I),I=9,NXPNTS)                                ISC11390
      ENDIF                                                             ISC11400
   60 CONTINUE                                                          ISC11410
C      INPUT Y FOR GRID RECEPTORS                                       ISC11420
      IF (NYPNTS .LE. 0) GO TO 110                                      ISC11430
C***  CARD GROUP 7 (NOT READ IF TAPE INPUT)                             ISC11440
      Y(3) = 0.0                                                        ISC11450
      Y(4) = 0.0                                                        ISC11460
      J = 8                                                             ISC11470
      IF (J .GT. NYPNTS) J = NYPNTS                                     ISC11480
      READ (IUNT,9002) (Y(I),I=1,J)                                     ISC11490
      IF(ISW(24).EQ.0) THEN                                             ISC11500
      WRITE(JUNT,9502) (Y(I),I=1,J)                                     ISC11510
      ENDIF                                                             ISC11520
      IF (ABS(Y(3))+ABS(Y(4))) 100,80,100                               ISC11530
   80 IF (NYPNTS .LT. 3) GO TO 110                                      ISC11540
      A1 = Y(2)                                                         ISC11550
      DO 90  I=2,NYPNTS                                                 ISC11560
   90 Y(I) = Y(I-1)+A1                                                  ISC11570
      GO TO 110                                                         ISC11580
  100 IF (NYPNTS .LE. 8) GO TO 110                                      ISC11590
C***  CARD GROUP 7 (CONTINUED)                                          ISC11600
      READ (IUNT,9002) (Y(I),I=9,NYPNTS)                                ISC11610
      IF(ISW(24).EQ.0) THEN                                             ISC11620
      WRITE(JUNT,9502) (Y(I),I=9,NYPNTS)                                ISC11630
      ENDIF                                                             ISC11640
  110 CONTINUE                                                          ISC11650
C     INPUT ELEVATIONS FOR GRID RECEPTORS                               ISC11660
      IF (ISW(4) .EQ. 0) GO TO 140                                      ISC11670
      IF (NXXYY .LE. 0) GO TO 140                                       ISC11680
      DO 130 J=1,NYPNTS                                                 ISC11690
      K = (J-1)*NXPNTS                                                  ISC11700
C***  CARD GROUP 8 (NOT READ IF TAPE INPUT)                             ISC11710
      READ (IUNT,9002) (Z(I+K),I=1,NXPNTS)                              ISC11720
      IF(ISW(24).EQ.0) THEN                                             ISC11730
      WRITE(JUNT,9502) (Z(I+K),I=1,NXPNTS)                              ISC11740
      ENDIF                                                             ISC11750
  130 CONTINUE                                                          ISC11760
C     READ CARD GROUPS 6A,7A, AND 8A                                    ISC11770
C     INPUT X,Y ,Z FOR EACH DISCRETE RECEPTOR.                          ISC11780
C     READ 1 CARD FOR EACH DISCRETE RECEPTOR.                           ISC11790
  140 IF(NXWYPT.LE.0.) GO TO 150                                        ISC11800
      DO 145 I=1,NXWYPT                                                 ISC11810
      READ(IUNT,9002) X(I+NXPNTS),Y(I+NYPNTS),Z(I+NXXYY)                ISC11820
      IF(ISW(24).EQ.0) THEN                                             ISC11830
      WRITE(JUNT,9502) X(I+NXPNTS),Y(I+NYPNTS),Z(I+NXXYY)               ISC11840
      ENDIF                                                             ISC11850
  145 CONTINUE                                                          ISC11860
C     CHANGE RECEPTOR ELEVATION UNITS FROM FT TO METERS.                ISC11870
  150 IF(ISW(4).LT.0) GO TO 155                                         ISC11880
      DO 151 I=1,NXXYYP                                                 ISC11890
  151 Z(I)=Z(I)*.3048006                                                ISC11900
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  155 ISW(4)=IABS(ISW(4))                                                ISC11910
C     READ FREQUENCY OF OCCURRENCE OF WIND SPEED VERSUS DIRECTION       ISC11920
C***  CARD GROUP 9 (NOT READ IF TAPE INPUT OR ISW(18)=0)                ISC11930
      IF (ISW(18) .NE. 0) READ (IUNT,9001) (FMT(I),I=1,20)              ISC11940
      IF(ISW(18).NE.0.AND.ISW(24).EQ.0) THEN                            ISC11950
      WRITE(JUNT,9501) (FMT(I),I=1,20)                                  ISC11960
      ENDIF                                                             ISC11970
      DO 160 L=1,NSEASN                                                 ISC11980
      DO 160 K=1,NSTBLE                                                 ISC11990
      M = 4*(K-1)+L                                                     ISC12000
      DO 160 J=1,NSCTOR                                                 ISC12010
C***  CARD GROUP 9A (NOT READ IF TAPE INPUT)                            ISC12020
      READ (IUNT,FMT) (FREQ(I,J,M),I=1,NSPEED)                          ISC12030
      IF(ISW(24).EQ.0) THEN                                             ISC12040
      WRITE(JUNT,9599) (FREQ(I,J,M),I=1,NSPEED)                         ISC12050
      ENDIF                                                             ISC12060
  160 CONTINUE                                                          ISC12070
C                                                                       ISC12080
C     READ AMBIENT AIR TEMP IN DEGREES KELVIN                           ISC12090
      DO 170 J=1,NSEASN                                                 ISC12100
C***  CARD GROUP 10 (NOT READ IF TAPE INPUT)                            ISC12110
      READ (IUNT,9002) (TA(I,J),I=1,NSTBLE)                             ISC12120
      IF(ISW(24).EQ.0) THEN                                             ISC12130
      WRITE(JUNT,9502) (TA(I,J),I=1,NSTBLE)                             ISC12140
      ENDIF                                                             ISC12150
  170 CONTINUE                                                          ISC12160
C                                                                       ISC12170
C     READ MIXING LAYER HEIGHTS IN METERS                               ISC12180
      DO 180 K=1,NSEASN                                                 ISC12190
      DO 180 J=1,NSTBLE                                                 ISC12200
C***  CARD GROUP 11 (NOT READ IF TAPE INPUT)                            ISC12210
      READ (IUNT,9002) (HM(I,J,K),I=1,NSPEED)                           ISC12220
      IF(ISW(24).EQ.0) THEN                                             ISC12230
      WRITE(JUNT,9502) (HM(I,J,K),I=1,NSPEED)                           ISC12240
      ENDIF                                                             ISC12250
  180 CONTINUE                                                          ISC12260
C                                                                       ISC12270
C     READ VERTICAL GRADIENT OF POTENTIAL TEMP. IN DEGREES K/METER      ISC12280
      DO 190 J=1,NSTBLE                                                 ISC12290
C***  CARD GROUP 12 (NOT READ IF TAPE INPUT)                            ISC12300
      READ (IUNT,9002) (DPDZ(I,J),I=1,NSPEED)                           ISC12310
      IF(ISW(24).EQ.0) THEN                                             ISC12320
      WRITE(JUNT,9502) (DPDZ(I,J),I=1,NSPEED)                           ISC12330
      ENDIF                                                             ISC12340
  190 CONTINUE                                                          ISC12350
C                                                                       ISC12360
C     READ MISC. PARAMETERS                                             ISC12370
C***  CARD GROUP 13 (NOT READ IF TAPE INPUT)                            ISC12380
      READ (IUNT,9002) ROTATE,TK,ZR,G,DECAY                             ISC12390
      IF(ISW(24).EQ.0) THEN                                             ISC12400
      WRITE(JUNT,9502) ROTATE,TK,ZR,G,DECAY                             ISC12410
      ENDIF                                                             ISC12420
C     SET DECAY IF REG. DEFAULT OPTION CHOSEN                           ISC12430
      IF(ISW(22).NE.0) GO TO 195                                        ISC12440
      IF(ISW(23).NE.0) GO TO 195                                        ISC12450
      IF(ISW(9).EQ.0.OR.ISW(9).EQ.3) GO TO 195                          ISC12460
      DECAY=.0000481                                                    ISC12470
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  195 CONTINUE                                                          ISC12480
C                                                                       ISC12490
C     READ WIND SPEED IN MPS                                            ISC12500
C***  CARD GROUP 14 (NOT READ IF TAPE INPUT)                            ISC12510
      READ (IUNT,9002) (UBAR(I),I=1,NSPEED)                             ISC12520
      IF(ISW(24).EQ.0) THEN                                             ISC12530
      WRITE(JUNT,9502) (UBAR(I),I=1,NSPEED)                             ISC12540
      ENDIF                                                             ISC12550
C                                                                       ISC12560
C     READ WIND DIRECTION SECTOR ANGLES (DEGREES)                       ISC12570
C***  CARD GROUP 15 (NOT READ IF TAPE INPUT)                            ISC12580
      READ (IUNT,9002) (PHI(I),I=1,NSCTOR)                              ISC12590
      IF(ISW(24).EQ.0) THEN                                             ISC12600
      WRITE(JUNT,9502) (PHI(I),I=1,NSCTOR)                              ISC12610
      ENDIF                                                             ISC12620
C                                                                       ISC12630
C     READ WIND SPEED POWER LAW EXPONENTS                               ISC12640
      DO 200 J=1,NSTBLE                                                 ISC12650
C***  CARD GROUP 16 (NOT READ IF TAPE INPUT)                            ISC12660
      READ (IUNT,9002) (P(I,J),I=1,NSPEED)                              ISC12670
      IF(ISW(24).EQ.0) THEN                                             ISC12680
      WRITE(JUNT,9502) (P(I,J),I=1,NSPEED)                              ISC12690
      ENDIF                                                             ISC12700
 200  CONTINUE                                                          ISC12710
      GO TO 230                                                         ISC12720
C                                                                       ISC12730
C   * TAPE INPUT SECTION *                                             ISC12740
C                                                                       ISC12750
  210 READ (MUNT) (X(I),I=1,NXPS)                                       ISC12760
      READ (MUNT) (Y(I),I=1,NYPS)                                       ISC12770
      IF (ISW(4) .NE. 0) READ (MUNT) (Z(I),I=1,NXXYYP)                  ISC12780
      IF (ISW(12) .LE. 0.OR.NXWY .LE. 0) GO TO 220                      ISC12790
      NXWYPT = NXWY                                                     ISC12800
C***  CARD GROUP 6A,7A,8A FOR MAXIMUMS WITH TAPE INPUT                  ISC12810
C     READ 1 CARD FOR EACH DISCRETE RECEPTOR                            ISC12820
C     IF ELEVATIONS ARE NOT DESIRED, LEAVE THE LAST                     ISC12830
C     VALUE ON EACH CARD BLANK                                          ISC12840
      DO 215 I=1,NXWYPT                                                 ISC12850
 215  READ(IUNT,9002) X(I),Y(I),Z(I)                                    ISC12860
      NXPS = NXWYPT                                                     ISC12870
      NYPS = NXWYPT                                                     ISC12880
      NXXYY = 0                                                         ISC12890
      NXXYYP = NXWYPT                                                   ISC12900
      NXPNTS = 0                                                        ISC12910
      NYPNTS = 0                                                        ISC12920
  220 CONTINUE                                                          ISC12930
      READ (MUNT) (FFQ(I),I=1,NMET)                                     ISC12940
  230 IF (ISW(5) .EQ. 0.OR.ISW(5) .EQ. 2) GO TO 240                     ISC12950
C                                                                       ISC12960
C     WRITE OUTPUT TAPE                                                 ISC12970
      WRITE (NUNT) (X(I),I=1,NXPS)                                      ISC12980
      WRITE (NUNT) (Y(I),I=1,NYPS)                                      ISC12990
      IF (ISW(4) .NE. 0) WRITE (NUNT) (Z(I),I=1,NXXYYP)                 ISC13000
      WRITE (NUNT) (FFQ(I),I=1,NMET)                                    ISC13010
  240 CONTINUE                                                          ISC13020
C                                                                       ISC13030
C     DEFAULT INPUT DATA                                                ISC13040
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C*************************************************************************ISC13050
C     WIND SPEED                                                          ISC13060
      DO 250 I=1,NSPEED                                                   ISC13070
  250 IF (UBAR(I) .LE. 0.0) UBAR(I) = UBRS(I)                             ISC13080
C     WIND PROFILE POWER LAW EXPONENT                                     ISC13090
      DO 280 J=1,NSTBLE                                                   ISC13100
      IF(P(1,J) .NE. 0.0.AND.ISW(22).NE.0) GO TO 260                      ISC13110
      I = ISTBLE(J)                                                       ISC13120
      IF (ISW(9) .EQ. 2.AND.J .GT. 1) I = I+1                             ISC13130
C     SET URBAN OR RURAL DEFAULT WIND PROFILE EXPONENTS                   ISC13140
      IF(ISW(9).EQ.0.OR.ISW(9).EQ.3) THEN                                 ISC13150
      P(1,J)=PPR(I)                                                       ISC13160
      ELSE                                                                ISC13170
      P(1,J)=PPU(I)                                                       ISC13180
      ENDIF                                                               ISC13190
  260 C7 = P(1,J)                                                         ISC13200
      IF(C7 .LT. 0.0) P(1,J) = 0.0                                        ISC13210
      DO 270 I=2,NSPEED                                                   ISC13220
      IF(P(I,J).EQ.0.0.OR.ISW(22).EQ.0) P(I,J)=C7                         ISC13230
      C7 = P(I,J)                                                         ISC13240
      IF (P(I,J) .LT. 0.0) P(I,J) = 0.0                                   ISC13250
  270 CONTINUE                                                            ISC13260
  280 CONTINUE                                                            ISC13270
C     TK AND UNITS                                                        ISC13280
      IF (TK .GT. 0.0) GO TO 320                                          ISC13290
      TK = 1.0E6                                                          ISC13300
      IF (ISW(1) .EQ. 2) GO TO 300                                        ISC13310
      DO 290 I=1,20                                                       ISC13320
  290 UNITS(I) = UNIT(I)                                                  ISC13330
      GO TO 320                                                           ISC13340
  300 TK = 1.0                                                            ISC13350
      DO 310 I=1,20                                                       ISC13360
  310 UNITS(I) = UNIS(I)                                                  ISC13370
  320 CONTINUE                                                            ISC13380
      IF (G .LE. 0.0) G = 9.8                                             ISC13390
      IF (ZR .LE. 0.0) ZR = 10.0                                          ISC13400
      ZRMIN = ZR                                                          ISC13410
      IF (ZRMIN .GT. 10.0) ZRMIN = 10.0                                   ISC13420
C     WIND DIRECTION                                                      ISC13430
      IF (PHI(1) .GT. 0.0.OR.PHI(2) .GT. 0.0) GO TO 340                   ISC13440
      DO 330 I = 1,NSCTOR                                                 ISC13450
  330 PHI(I) = 22.5 * FLOAT(I-1)                                          ISC13460
C     VERTICAL GRADIENT OF POTENTIAL TEMP.                                ISC13470
  340 DO 370 J=1,NSTBLE                                                   ISC13480
      IF (DPDZ(1,J) .NE. 0.0) GO TO 350                                   ISC13490
      I = ISTBLE(J)                                                       ISC13500
      IF (ISW(9) .EQ. 2.AND.J .GT. 1) I = I + 1                           ISC13510
      IF (I .LT. 5) GO TO 350                                             ISC13520
      DPDZ(1,J) = STBLE(I-4)                                              ISC13530
  350 C7 = DPDZ(1,J)                                                      ISC13540
      IF(C7 .LT. 0.0) DPDZ(1,J) = 0.0                                     ISC13550
      DO 360 I=2,NSPEED                                                   ISC13560
      IF (DPDZ(I,J) .EQ. 0.0) DPDZ(I,J) = C7                              ISC13570
      C7 = DPDZ(I,J)                                                      ISC13580
      IF (DPDZ(I,J) .LT. 0.0) DPDZ(I,J) = 0..                             ISC13590
  360 CONTINUE                                                            ISC13600
  370 CONTINUE                                                            ISC13610
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C     IF REG. DEFAULT OPTION CHOSEN, FORCE DEFAULT                          ISC13620
C     VALUE OF DPDZ.                                                        ISC13630
      IF(ISW(22).EQ.0) THEN                                                 ISC13640
      DO 378 J=1,NSTBLE                                                     ISC13650
      IS=ISTBLE(J)                                                          ISC13660
      IF(IS.LT.5) THEN                                                      ISC13670
      DO 375 I=1,NSPEED                                                     ISC13680
  375 DPDZ(I,J)=0.                                                          ISC13690
      ELSE                                                                  ISC13700
      DO 377 I=1,NSPEED                                                     ISC13710
  377 DPDZ(I,J)=STBLE(IS-4)                                                 ISC13720
      ENDIF                                                                 ISC13730
  378 CONTINUE                                                              ISC13740
      ENDIF                                                                 ISC13750
C     TEMPERATURE                                                           ISC13760
      DO 380 J=1,NSEASN                                                     ISC13770
      C7 = TA(1,J)                                                          ISC13780
      DO 380 I=2,NSTBLE                                                     ISC13790
      IF (TA(I,J) .GT. 0.0) C7 = TA(I,J)                                    ISC13800
      IF (TA(I,J) .LE. 0.0) TA(I,J) = C7                                    ISC13810
  380 CONTINUE                                                              ISC13820
C     MIXING LAYER HEIGHT                                                   ISC13830
      C8 = 0.0                                                              ISC13840
      DO 390 K=1,NSEASN                                                     ISC13850
      DO 390 J=1,NSTBLE                                                     ISC13860
      IF (ISW(9) .EQ. 3.AND.ISTBLE(J) .GE. 5) HM(1,J,K) = 1.0E4             ISC13870
      IF (ISW(9) .EQ. 4 .AND. ISTBLE(J) .GE. 5) HM(1,J,K)=1.0E4             ISC13880
      IF (HM(1,J,K) .LE. 0.0) HM(1,J,K) = C8                                ISC13890
      C7 = HM(1,J,K)                                                        ISC13900
      C8 = C7                                                               ISC13910
      DO 390 I=2,NSPEED                                                     ISC13920
      IF (HM(I,J,K) .GT. 0.0) C7 = HM(I,J,K)                                ISC13930
      IF (HM(I,J,K) .LE. 0.0) HM(I,J,K) = C7                                ISC13940
      IF (ISW(9) .EQ. 3.AND.ISTBLE(J) .GE. 5) HM(I,J,K) = 1.0E4             ISC13950
  390 CONTINUE                                                              ISC13960
      DO 430 L=1,NSEASN                                                     ISC13970
      A1 = 0.0                                                              ISC13980
      DO 400 K=1,NSTBLE                                                     ISC13990
      M = 4*(K-1)+L                                                         ISC14000
      DO 400 J=1,NSCTOR                                                     ISC14010
      DO 400 I=1,NSPEED                                                     ISC14020
  400 A1 = A1+FREQ(I,J,M)                                                   ISC14030
      IF (0.99 .LE. A1.AND.A1 .LE. 1.01) GO TO 410                          ISC14040
      CALL TITLR(1,3,1)                                                     ISC14050
      WRITE (JUNT,9006) L,A1                                                ISC14060
  410 A1 = 1.0/A1                                                           ISC14070
      DO 420 K=1,NSTBLE                                                     ISC14080
      M = 4*(K-1)+L                                                         ISC14090
      DO 420 J=1,NSCTOR                                                     ISC14100
      DO 420 I=1,NSPEED                                                     ISC14110
  420 FREQ(I,J,M) = FREQ(I,J,M)*A1                                          ISC14120
  430 CONTINUE                                                              ISC14130
C                                                                           ISC14140
C     WRITE INPUT DATA                                                      ISC14150
C*************************************************************************ISC14160
      IF (ISW(6) .EQ. 0.OR.ISW(6) .EQ. 2) GO TO 630                         ISC14170
      CALL TITLR(8,2,2)                                                     ISC14180
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      WRITE (JUNT,9004) NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,      ISC14190
     1NSTBLE,NSCTOR,NOFILE                                              ISC14200
      IF (ISW(9) .EQ. 0) GO TO 440                                      ISC14210
      J = ISW(9)                                                        ISC14220
      CALL TITLR(1,2,0)                                                 ISC14230
      WRITE (JUNT,9005) (MSG1(I,J),I=1,3)                               ISC14240
  440 CALL TITLR(8,2,0)                                                 ISC14250
      WRITE (JUNT,9007) TK,G,ZR,ROTATE,DECAY                            ISC14260
      WRITE (JUNT,9008) ISW                                             ISC14270
      IF (NGROUP .LE. 0) GO TO 480                                      ISC14280
      LINE = 23                                                         ISC14290
      KK = 0                                                            ISC14300
      DO 470 J=1,NGROUP                                                 ISC14310
      K = NOCOMB(J)                                                     ISC14320
      IF (J .GT. 1) KK = KK+NOCOMB(J-1)                                 ISC14330
      IF (K .EQ. 0) GO TO 460                                           ISC14340
      J1 = 1                                                            ISC14350
      J2 = K                                                            ISC14360
      IF (J2 .GT. 10) J2 = 10                                           ISC14370
      CALL TITLR(1,2,0)                                                 ISC14380
      WRITE (JUNT,9031) J,(IDSORC(I+KK),I=J1,J2)                        ISC14390
  450 J1 = J2                                                           ISC14400
      J1 = J1+1                                                         ISC14410
      IF (J1 .GT. K) GO TO 470                                          ISC14420
      J2 = J1+9                                                         ISC14430
      IF (J2 .GT. K) J2 = K                                             ISC14440
      CALL TITLR(1,2,0)                                                 ISC14450
      WRITE (JUNT,9032) (IDSORC(I+KK),I=J1,J2)                          ISC14460
      GO TO 450                                                         ISC14470
  460 CALL TITLR(1,2,0)                                                 ISC14480
      WRITE (JUNT,9033) J                                               ISC14490
  470 CONTINUE                                                          ISC14500
      GO TO 490                                                         ISC14510
  480 J = 1                                                             ISC14520
      IF (ISW(8) .EQ. 1) GO TO 490                                      ISC14530
      WRITE (JUNT,9033) J                                               ISC14540
  490 CONTINUE                                                          ISC14550
      IF (ISW(4) .EQ. 0) GO TO 500                                      ISC14560
      KK = 3                                                            ISC14570
      CALL OUTPT(KK,K,X,Y,Z,1)                                          ISC14580
      LINE = NLINES                                                     ISC14590
      GO TO 540                                                         ISC14600
  500 CONTINUE                                                          ISC14610
      IF (NXPNTS .LE. 0) GO TO 510                                      ISC14620
      L = 1                                                             ISC14630
      IF (ISW(2) .EQ. 2) L = 2                                          ISC14640
      I = (NXPNTS-6)/10+1                                               ISC14650
      CALL TITLR(I,2,0)                                                 ISC14660
      WRITE (JUNT,9009) (MSG7(I,L),I=1,4),MSG8(1),(MSG2(I,1),I=1,6),    ISC14670
     1(MSG9(I,1),I=1,2),(X(I),I=1,NXPNTS)                               ISC14680
  510 IF (NXWYPT .LE. 0) GO TO 520                                      ISC14690
      L = 1                                                             ISC14700
      IF (ISW(3) .EQ. 2) L = 2                                          ISC14710
      I = (NXWYPT-6)/10+1                                               ISC14720
      CALL TITLR(I,2,0)                                                 ISC14730
      WRITE (JUNT,9009) (MSG7(I,L),I=1,4),MSG8(1),(MSG2(I,2),I=1,6),    ISC14740
     1(MSG9(I,1),I=1,2),(X(I+NXPNTS),I=1,NXWYPT)                        ISC14750
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  520 IF (NYPNTS .LE. 0) GO TO 530                                          ISC14760
      L = 1                                                                 ISC14770
      IF (ISW(2) .EQ. 2) L = 3                                              ISC14780
      J = 1                                                                 ISC14790
      IF (ISW(2) .EQ. 2) J = 2                                              ISC14800
      I = (NYPNTS-6)/10+1                                                   ISC14810
      CALL TITLR(I,2,0)                                                     ISC14820
      WRITE (JUNT,9009) (MSG7(I,L),I=1,4),MSG8(2),(MSG2(I,1),I=1,6),        ISC14830
     1(MSG9(I,J),I=1,2),(Y(I),I=1,NYPNTS)                                   ISC14840
  530 IF (NXWYPT .LE. 0) GO TO 540                                          ISC14850
      L = 1                                                                 ISC14860
      IF (ISW(3) .EQ. 2) L = 3                                              ISC14870
      J = 1                                                                 ISC14880
      IF (ISW(3) .EQ. 2) J = 2                                              ISC14890
      I = (NXWYPT-6)/10+1                                                   ISC14900
      CALL TITLR(I,2,0)                                                     ISC14910
      WRITE (JUNT,9009) (MSG7(I,L),I=1,4),MSG8(2),(MSG2(I,2),I=1,6),        ISC14920
     1(MSG9(I,J),I=1,2),(Y(I+NYPNTS),I=1,NXWYPT)                            ISC14930
  540 CONTINUE                                                              ISC14940
      CALL TITLR(5+NSEASN,2,0)                                              ISC14950
      WRITE (JUNT,9010) (I,I=1,6)                                           ISC14960
      DO 550 K=1,NSEASN                                                     ISC14970
  550 WRITE (JUNT,9011) K,(TA(I,K),I=1,NSTBLE)                              ISC14980
  560 CALL TITLR(3+NSEASN*(3+NSTBLE),2,0)                                   ISC14990
      WRITE (JUNT,9012)                                                     ISC15000
      DO 570 K=1,NSEASN                                                     ISC15010
      WRITE (JUNT,9013) K,(I,I=1,6)                                         ISC15020
      DO 570 I=1,NSTBLE                                                     ISC15030
  570 WRITE (JUNT,9014) I,(HH(J,I,K),J=1,NSPEED)                            ISC15040
      DO 600 K=1,NSEASN                                                     ISC15050
      DO 600 I=1,NSTBLE                                                     ISC15060
      M = 9+NSCTOR                                                          ISC15070
      IF (K .EQ. 1.AND.I .EQ. 1) M = M+2                                    ISC15080
      CALL TITLR(M,2,0)                                                     ISC15090
      IF (LINE .LE. M+4) GO TO 580                                          ISC15100
      IF (K .NE. 1.OR.I .NE. 1) GO TO 590                                   ISC15110
  580 CONTINUE                                                              ISC15120
      WRITE (JUNT,9015)                                                     ISC15130
  590 WRITE (JUNT,9016) K                                                   ISC15140
      WRITE (JUNT,9017) I,(J,J=1,6),(UBAR(J),J=1,6)                         ISC15150
      L = 4*(I-1)+K                                                         ISC15160
      DO 600 N=1,NSCTOR                                                     ISC15170
  600 WRITE (JUNT,9018) PHI(N),(FREQ(J,N,L),J=1,NSPEED)                     ISC15180
      CALL TITLR(5+NSTBLE,2,0)                                              ISC15190
      WRITE (JUNT,9019)                                                     ISC15200
      WRITE (JUNT,9020) (J,J=1,NSPEED)                                      ISC15210
      DO 610 I=1,NSTBLE                                                     ISC15220
  610 WRITE (JUNT,9021) I,(DPDZ(J,I),J=1,NSPEED)                            ISC15230
      CALL TITLR(5+NSTBLE,2,0)                                              ISC15240
      WRITE (JUNT,9022)                                                     ISC15250
      WRITE (JUNT,9020) (J,J=1,NSPEED)                                      ISC15260
      DO 620 I=1,NSTBLE                                                     ISC15270
  620 WRITE (JUNT,9021) I,(P(J,I),J=1,NSPEED)                               ISC15280
  630 CONTINUE                                                              ISC15290
C                                                                           ISC15300
C     CALCULATE INTERNAL MODEL CONSTANTS                                    ISC15310
C*************************************************************************ISC15320
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      DO 640 N=1,NSCTOR                                                 ISC15330
      A1 = (PHI(N)-ROTATE)*RADIAN                                       ISC15340
      PHC(N) = COS(A1)                                                  ISC15350
  640 PHS(N) = SIN(A1)                                                  ISC15360
      C8 = ABS(PHI(2)-PHI(1))                                           ISC15370
      IF (C8 .LE. 0.0) C8 = 22.5                                        ISC15380
      TR = C8*RADIAN                                                    ISC15390
      TRI = 1.0/TR                                                      ISC15400
      TNN = TAN(TR)                                                     ISC15410
      TNNI = 1.0/TAN(0.5*TR)                                            ISC15420
      ZRI = 1.0/ZR                                                      ISC15430
      NXPSS = NXPNTS-NXXYY                                              ISC15440
      NYPSS = NYPNTS-NXXYY                                              ISC15450
      PP1 = TK*.398942281*TRI                                           ISC15460
      IF (ISW(1) .LE. 1) PP1 = PP1*2.0                                  ISC15470
      XYPU = 2.15*TNNI                                                  ISC15480
      XSEA = 1.0/FLOAT(NSEASN)                                          ISC15490
C                                                                       ISC15500
C*** START SECTION THAT LOOPS OVER SOURCE COMBINATIONS.                 ISC15510
C***********************************************************************ISC15520
C                                                                       ISC15530
C     SAVE SPECIAL OPTIONS FOR MAXIMA                                   ISC15540
      IF (ISW(10) .NE. 0) GO TO 650                                     ISC15550
      ISW(11) = 0                                                       ISC15560
      ISW(12) = 0                                                       ISC15570
  650 ISW11 = ISW(11)                                                   ISC15580
      ISW12 = ISW(12)                                                   ISC15590
      ISW10 = ISW(10)                                                   ISC15600
      ISW8 = ISW(8)                                                     ISC15610
      NOTAP = 0                                                         ISC15620
C     NOTAP = 0 MEANS ALL TAPE DATA, NOT ENOUGH CORE TO HOLD ALL SOURCESISC15630
C     NOTAP > 0 MEANS ALL SOURCES IN COMBINED REPORTS SAVED IN CORE.    ISC15640
      L91 = -1                                                          ISC15650
      IF (ISW(8) .NE. 1.OR.ISW(11) .EQ. 2) L91 = NSEASN-1               ISC15660
C     L91 MAKES ROOM FOR SUM OF COMBINED SOURCES IN ARRAY CON           ISC15670
C     L92 IF=1 MAKES ROOM FOR ANNUAL SUM                                ISC15680
      NXYSEA = NXXYYP*NSEASN                                            ISC15690
      L92 = 2                                                           ISC15700
      IF (ISW(4) .GT. 0.AND.ISW(11) .EQ. 2) GO TO 660                   ISC15710
      L92 = 0                                                           ISC15720
      IF (ISW(7) .EQ. 1.OR.NSEASN .EQ. 1) GO TO 660                     ISC15730
      IF (NGROUP .EQ. 0) GO TO 660                                      ISC15740
      L92 = 1                                                           ISC15750
  660 CONTINUE                                                          ISC15760
      IF (NGROUP .EQ. 0.AND.ISW(11) .NE. 2) GO TO 690                   ISC15770
C     SEE IF CAN DO ALL COMBINATIONS IN CORE (NOTAP > 0)                ISC15780
      I = NXPS*NYPS                                                     ISC15790
      IF (ISW(4) .NE. 0) I = I*NXXYYP                                   ISC15800
      IF (L92 .EQ. 1) I = I+NXXYYP                                      ISC15810
      IF (L91 .NE. -1) I = I+NXYSEA                                     ISC15820
      NOTAP = I                                                         ISC15830
      IF (ISW(5) .EQ. 1.OR.ISW(5) .EQ. 3.OR.NSOURC .EQ. 0) GO TO 690    ISC15840
      IF (NSOURC .LT. 0) GO TO 685                                      ISC15850
      J = IEND-I                                                        ISC15860
      IF (NSOURC .LE. J/NXYSEA.AND.NSOURC .LE. 300) GO TO 690           ISC15870
      IF (NSOURC .GT. 300) GO TO 680                                    ISC15880
      I = I+NSOURC*NSEASN*NXXYYP                                        ISC15890
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C     ERROR WILL EXCEED CORE
  670 WRITE (JUNT,9034) IEND,I                                          ISC15900
      GO TO 2490                                                        ISC15910
  680 WRITE (JUNT,9035)                                                 ISC15920
      GO TO 2490                                                        ISC15930
  685 WRITE (JUNT,9045)                                                 ISC15940
  690 CONTINUE                                                          ISC15950
      IF (L92 .EQ. 1.AND.NOTAP .EQ. 0) L92 = 0                          ISC15960
      IF (L92 .EQ. 1) L91 = L91+1                                       ISC15970
      IF (NGROUP .EQ. 0) NGROUP = 1                                     ISC15980
C     START ACTUAL COMBINATIONS LOOP                                    ISC15990
      NGT = 0                                                           ISC16000
      NG = 0                                                            ISC16010
  700 NG = NG+1                                                         ISC16020
      IF (NG .GT. NGROUP) GO TO 2500                                    ISC16030
      IF (ISW(16) .EQ. 0.OR.NG .EQ. 1) LINE = NLINES                    ISC16040
      IF (NG .GT. 1) NGT = NGT+NOCOMB(NG-1)                             ISC16050
C     EACH COMBINATION MAY BE 1 OR 2 PASSES. IF ISW(11)=2 INITIALLY THENISC16060
C     EACH COMBINATION TAKES TWO PASSES, ONE FOR DETERMINATION OF THE   ISC16070
C     MAXIMA AND THE SECOND FOR DISPLAY.                                ISC16080
C                                                                       ISC16090
C     START FIRST PASS FOR COMBINATION NG                               ISC16100
      ISW(10) = ISW10                                                   ISC16110
      ISW(11) = ISW11                                                   ISC16120
      ISW(12) = ISW12                                                   ISC16130
      IF (ISW(11) .EQ. 2) ISW(10) = 1                                   ISC16140
      ISW(8) = ISW8                                                     ISC16150
      IF (ISW(8).GE.2.AND.NOCOMB(NG).EQ.1.AND.IDSORC(NGT+1).GT.0) ISW(8)ISC16160
     1= 1                                                               ISC16170
      GO TO 720                                                         ISC16180
C     START SECOND PASS HERE                                            ISC16190
  710 CONTINUE                                                          ISC16200
      ISW(11) = 0                                                       ISC16210
      ISW(12) = -1                                                      ISC16220
      ISW(10) = ISW10                                                   ISC16230
  720 IF (NG .EQ. 1.AND.ISW(12) .NE. -1) GO TO 760                      ISC16240
      IF (NOTAP .NE. 0) GO TO 760                                       ISC16250
C     REWIND AND POSITION INPUT TAPE FOR ADDITIONAL PASSES              ISC16260
      REWIND MUNT                                                       ISC16270
      IF (ISW(14) .LT. 0) GO TO 750                                     ISC16280
      K = 0                                                             ISC16290
  730 K = K+1                                                           ISC16300
      IF (K .GE. NOFILE) GO TO 750                                      ISC16310
  740 READ (MUNT,END=730) (CON(I),I=1,5)                                ISC16320
      GO TO 740                                                         ISC16330
  750 CONTINUE                                                          ISC16340
      READ (MUNT) (CON(I),I=1,72)                                       ISC16350
      READ (MUNT) (CON(I),I=1,NXPS)                                     ISC16360
      READ (MUNT) (CON(I),I=1,NYPS)                                     ISC16370
      IF (ISW(4) .GT. 0) READ (MUNT) (CON(I),I=1,NXXYYP)                ISC16380
      READ (MUNT) (CON(I),I=1,NMET)                                     ISC16390
  760 KSO = 0                                                           ISC16400
      L9 = 0                                                            ISC16410
      IF (ISW8 .EQ. 1.AND.ISW11 .NE. 2) GO TO 780                       ISC16420
C     ZERO SOURCE COMBINATION ARRAYS                                    ISC16430
      DO 770 K=1,NSEASN                                                 ISC16440
      L1 = (K-1)*NXXYYP                                                 ISC16450
                                                                        ISC16460
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      IF (L92 .EQ. 1) L1 = L1+NXXYYP                                    ISC16470
      DO 770 I=1,NXXYYP                                                 ISC16480
  770 CON(L1+I) = 0.0                                                   ISC16490
  780 CONTINUE                                                          ISC16500
C                                                                       ISC16510
C**** START LOOP  OVER CARD AND/OR TAPE INPUT SOURCE DATA               ISC16520
C*******************************************************************  ISC16530
C                                                                       ISC16540
      IF (NG .GT. 1.OR.ISW(12) .EQ. -1) GO TO 790                       ISC16550
C     M1 - COUNTER FOR CARD SOURCES                                     ISC16560
      M1 = 0                                                            ISC16570
C     N1 - COUNTER FOR TAPE SOURCES                                     ISC16580
      N1 = 0                                                            ISC16590
C     K1 - COUNTER FOR TOTAL SOURCES                                    ISC16600
      K1 = 0                                                            ISC16610
C     NT - COUNTER FOR SOURCE TO OUTPUT TAPE SUMMARY TABLE              ISC16620
      NT = 0                                                            ISC16630
C     NTT - MAX. NO. SOURCES IN OUTPUT TAPE SUMMARY BUFFER              ISC16640
      NTT = 572                                                         ISC16650
C     IFLG1 - FLAG FOR END OF CARDS                                     ISC16660
      IFLG1 = 0                                                         ISC16670
C     IFLG2 - FLAG FOR END OF TAPE                                      ISC16680
      IFLG2 = 0                                                         ISC16690
C     IFLG3 - FLAG FOR READ CARD ONLY =2, READ TAPE ONLY = 3, BOTH = 1  ISC16700
      IFLG3 =1                                                          ISC16710
      IF (ISW(5) .LE. 1) IFLG2 = 1                                      ISC16720
      IF (NSOURC .EQ. 0) IFLG1 = 1                                      ISC16730
  790 CONTINUE                                                          ISC16740
      IF (NG .EQ. 1.AND.ISW(12) .NE. -1) GO TO 830                      ISC16750
      IF (NOTAP .EQ. 0) GO TO 800                                       ISC16760
C     ALL SAVED IN CORE                                                 ISC16770
      IF (KSO+1 .GT. NSOURC) GO TO 2410                                 ISC16780
      NUMS = ISAVSO(KSO+1)                                              ISC16790
      GO TO 2260                                                        ISC16800
C     NOT SAVED IN CORE REREAD TAPE                                     ISC16810
  800 READ (MUNT,END=2410) (NSOR(I),I=1,NSO)                            ISC16820
      IF (NSOR(1) .NE. 999999) GO TO 810                                ISC16830
      IF (ISW(14) .GE. 0) GO TO 800                                     ISC16840
      GO TO 2410                                                        ISC16850
  810 CONTINUE                                                          ISC16860
      DO 820 K=1,NSEASN                                                 ISC16870
      L1 = (K+L91)*NXXYYP+L9                                            ISC16880
      READ (MUNT,END=2410) (CON(L1+I),I=1,NXXYYP)                       ISC16890
  820 CONTINUE                                                          ISC16900
      GO TO 2260                                                        ISC16910
  830 CONTINUE                                                          ISC16920
C     INITIAL CALCULATION PASS                                          ISC16930
      IPR4 = 0                                                          ISC16940
      IF (IFLG3 .EQ. 3) GO TO 1130                                      ISC16950
C     HAS END OF CARD DATA OCCURRED                                     ISC16960
      IF (IFLG1 .EQ. 1) GO TO 1130                                      ISC16970
      M1 = M1+1                                                         ISC16980
      IF(NSOURC .GT. 0.AND.M1 .GT. NSOURC) GO TO 1120                   ISC16990
C                                                                       ISC17000
C     READ DATA CARD SOURCE DATA                                        ISC17010
      READ (IUNT,9023,END=1120) NUMS1,DISP,TYPE1,QFLG1,DX1,DY1,H1,ZS1,TSISC17020
     11,VEL1,D1,HB1,BH1,WAKE1,NVS1                                      ISC17030
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      IF (NUMS1 .LT. 0) GO TO 1120                                      ISC17040
      IF (NUMS1 .EQ. 0) NUMS1 = M1                                      ISC17050
      IF (NUMS1 .GT. NUMSL) GO TO 840                                   ISC17060
      WRITE (JUNT,9041) NUMS1,NUMSL                                     ISC17070
      GO TO 2490                                                        ISC17080
  840 NUMSL = NUMS1                                                     ISC17090
      IF (DISP .LT. 3) GO TO 850                                        ISC17100
      WRITE (JUNT,9042) NUMS1                                           ISC17110
      GO TO 2490                                                        ISC17120
  850 IF (TYPE1 .LT. 3) GO TO 860                                       ISC17130
      WRITE (JUNT,9043) NUMS1                                           ISC17140
      GO TO 2490                                                        ISC17150
  860 IF (QFLG1 .LT. 4) GO TO 870                                       ISC17160
      WRITE (JUNT,9044) NUMS1                                           ISC17170
      GO TO 2490                                                        ISC17180
  870 CONTINUE                                                          ISC17190
      IF (DISP .NE. 0) GO TO 990                                        ISC17200
      IF (TYPE1 .GT. 0) GO TO 910                                       ISC17210
      IF (VEL1) 880,880,890                                             ISC17220
  880 WRITE (JUNT,9036) NUMS1                                           ISC17230
      VEL1 = 1.0E-5                                                     ISC17240
      LINE = LINE+1                                                     ISC17250
  890 IF (D1) 900,900,970                                               ISC17260
  900 WRITE (JUNT,9037) NUMS1                                           ISC17270
      GO TO 2490                                                        ISC17280
  910 IF (TYPE1 .GT. 1) GO TO 950                                       ISC17290
      IF (SIGY01) 920,920,930                                           ISC17300
  920 WRITE (JUNT,9038) NUMS1                                           ISC17310
      GO TO 2490                                                        ISC17320
  930 IF (VEL1) 940,940,970                                             ISC17330
  940 WRITE (JUNT,9039) NUMS1                                           ISC17340
      GO TO 2490                                                        ISC17350
  950 IF (XOP) 960,960,970                                              ISC17360
  960 WRITE (JUNT,9040) NUMS1                                           ISC17370
      GO TO 2490                                                        ISC17380
  970 CONTINUE                                                          ISC17390
      IF (TYPE1 .EQ. 0) GO TO 990                                       ISC17400
      IF (TYPE1 .EQ. 2) GO TO 980                                       ISC17410
C     VOLUME                                                            ISC17420
      BW1 = 4.3*SIGY01                                                  ISC17430
      GO TO 990                                                         ISC17440
C     AREA                                                              ISC17450
  980 BW1 = XOP                                                         ISC17460
      XOP = 0.0                                                         ISC17470
  990 CONTINUE                                                          ISC17480
      IF (DISP .EQ. 1) GO TO 1130                                       ISC17490
      IF (DISP .EQ. 2) GO TO 1010                                       ISC17500
      IF (NVS1 .GT. 0) GO TO 1000                                       ISC17510
      IF (ISW(1) .LE. 1) GO TO 1010                                     ISC17520
      WRITE (JUNT,9003) NUMS1                                           ISC17530
      GO TO 2490                                                        ISC17540
 1000 CONTINUE                                                          ISC17550
C     READ PARAMETERS FOR GRAVITATIONAL DEPOSITION                      ISC17560
      READ (IUNT,9002) (VS1(I),I=1,NVS1)                                ISC17570
      READ (IUNT,9002) (FRQ1(I),I=1,NVS1)                               ISC17580
      READ (IUNT,9002) (GAMMA1(I),I=1,NVS1)                             ISC17590
 1010 QFLGS = QFLG1+1                                                   ISC17600
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      IF (DISP .NE. 2.OR.QFLGS .LE. 1) GO TO 1020                       ISC17610
      WRITE (JUNT,9027) NUMS1                                           ISC17620
      GO TO 2490                                                        ISC17630
 1020 CONTINUE                                                          ISC17640
      GO TO (1030,1040,1060,1080),QFLGS                                 ISC17650
C     SOURCE STRENGTH VARIES WITH SEASON ONLY                           ISC17660
 1030 READ (IUNT,9002) (Q1(1,1,K),K=1,NSEASN)                           ISC17670
      L1 = 1                                                            ISC17680
      L2 = 1                                                            ISC17690
      GO TO 1100                                                        ISC17700
 1040 DO 1050 K=1,NSEASN                                                ISC17710
C     SOURCE STRENGTH VARIES WITH SEASON AND STABILITY OR SPEED         ISC17720
 1050 READ (IUNT,9002) (Q1(1,J,K),J=1,NSTBLE)                           ISC17730
      L1 = 1                                                            ISC17740
      L2 = 0                                                            ISC17750
      GO TO 1100                                                        ISC17760
 1060 DO 1070 K=1,NSEASN                                                ISC17770
C     SOURCE STRENGTH VARIES WITH SEASON, STABILITY AND SPEED           ISC17780
 1070 READ (IUNT,9002) (Q1(I,1,K),I=1,NSPEED)                           ISC17790
      L1 = 0                                                            ISC17800
      L2 = 1                                                            ISC17810
      GO TO 1100                                                        ISC17820
 1080 DO 1090 K=1,NSEASN                                                ISC17830
      DO 1090 J=1,NSTBLE                                                ISC17840
      READ (IUNT,9002) (Q1(I,J,K),I=1,NSPEED)                           ISC17850
 1090 CONTINUE                                                          ISC17860
      GO TO 1130                                                        ISC17870
 1100 DO 1110 K=1,NSEASN                                                ISC17880
      DO 1110 J=1,NSTBLE                                                ISC17890
      L4 = 1                                                            ISC17900
      IF (L2 .EQ. 0) L4 = J                                             ISC17910
      DO 1110 I=1,NSPEED                                                ISC17920
      L3 = 1                                                            ISC17930
      IF (L1 .EQ. 0) L3 = I                                             ISC17940
 1110 Q1(I,J,K) = Q1(L3,L4,K)                                           ISC17950
      GO TO 1130                                                        ISC17960
 1120 IFLG1 = 1                                                         ISC17970
      DISP = 0                                                          ISC17980
      IF (NSOURC .LT. 0) NSOURC = M1 - 1                                ISC17990
 1130 IF (IFLG3 .EQ. 2) GO TO 1160                                      ISC18000
C     HAS END OF TAPE DATA OCCURRED                                     ISC18010
      IF (IFLG2 .EQ. 1) GO TO 1160                                      ISC18020
C                                                                       ISC18030
C     READ TAPE SOURCE DATA                                             ISC18040
 1140 READ (MUNT,END=1150) (NSOR2(I),I=1,NSO)                           ISC18050
      IF (NSOR2(1) .NE. 999999) GO TO 1160                              ISC18060
      IF (ISW(14) .GE. 0) GO TO 1140                                    ISC18070
 1150 IFLG2 = 1                                                         ISC18080
 1160 IF (IFLG1 .EQ. 1.AND.IFLG2 .EQ. 1) GO TO 1350                     ISC18090
      IF (IFLG1 .EQ. 1) GO TO 1300                                      ISC18100
      IF (IFLG2 .EQ. 1) GO TO 1270                                      ISC18110
C     CARD AND TAPE INPUT, COMPARE SOURCE NUMBERS                       ISC18120
      IF (NUMS1 .LT. NUMS2) GO TO 1330                                  ISC18130
      IF (NUMS2 .LT. NUMS1) GO TO 1300                                  ISC18140
C     SAME SOURCE, IF DISP = 1 THEN DELETION ONLY                       ISC18150
C     IF DISP = 2 RESCALE CON (DEP)                                     ISC18160
      IFLG3 = 1                                                         ISC18170
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      L3 = 1                                                            ISC18180
 1170 CONTINUE                                                          ISC18190
      IF (NOTAP .EQ. 0) GO TO 1200                                      ISC18200
      IF (L9+NOTAP+NXYSEA .LE. IEND) GO TO 1200                         ISC18210
      IF (ISW(5) .EQ. 1.OR.ISW(5) .EQ. 3) GO TO 1190                    ISC18220
      IF (ISW(5) .EQ. 2.AND.NSOURC .EQ. 0) GO TO 1190                   ISC18230
 1180 CONTINUE                                                          ISC18240
      I = L9+NOTAP+NXYSEA                                               ISC18250
      GO TO 670                                                         ISC18260
 1190 NOTAP = 0                                                         ISC18270
      L9 = 0                                                            ISC18280
 1200 CONTINUE                                                          ISC18290
      DO 1210 K=1,NSEASN                                                ISC18300
      L1 = (K+L91)*NXXYYP+L9                                            ISC18310
      READ (NUNT,END=1150) (CON(L1+I),I=1,NXXYYP)                       ISC18320
 1210 CONTINUE                                                          ISC18330
      GO TO (1220,1370 ),L3                                             ISC18340
 1220 CONTINUE                                                          ISC18350
      IF (DISP .EQ. 1) GO TO 790                                        ISC18360
      IF (DISP .NE. 2) GO TO 1250                                       ISC18370
C     RESCALE                                                          ISC18380
      DO 1240 K=1,NSEASN                                                ISC18390
      L1 = (K+L91)*NXXYYP+L9                                            ISC18400
      C8 = Q1(1,1,K)/Q2(1,1,K)                                          ISC18410
      DO 1230 J=1,NSTBLE                                                ISC18420
      DO 1230 I=1,NSPEED                                                ISC18430
 1230 Q2(I,J,K) = Q1(1,1,K)                                             ISC18440
      DO 1240 I=1,NXXYYP                                                ISC18450
      CON(L1+I) = CON(L1+I)*C8                                          ISC18460
 1240 CONTINUE                                                          ISC18470
      GO TO 1310                                                        ISC18480
 1250 CONTINUE                                                          ISC18490
C     REPLACE TAPE SOURCE WITH CARD SOURCE                             ISC18500
 1260 IF (DISP .LE. 0) GO TO 1280                                       ISC18510
      WRITE (JUNT,9028) NUMS1                                           ISC18520
      GO TO 2490                                                        ISC18530
 1270 IF (DISP .LE. 0) GO TO 1340                                       ISC18540
      WRITE (JUNT,9028) NUMS1                                           ISC18550
      GO TO 2490                                                        ISC18560
 1280 K1 = K1+1                                                         ISC18570
      ICARD = 1                                                         ISC18580
      DO 1290 I=1,NSO                                                   ISC18590
 1290 NSOR(I) = NSOR1(I)                                                ISC18600
      GO TO 1370                                                        ISC18610
C     STORE TAPE SOURCE, HOLD CARD SOURCE                              ISC18620
 1300 IFLG3 = 3                                                         ISC18630
 1310 CONTINUE                                                          ISC18640
      ICARD = 0                                                         ISC18650
      K1 = K1+1                                                         ISC18660
      DO 1320  I=1,NSO                                                  ISC18670
 1320 NSOR(I) = NSOR2(I)                                                ISC18680
      IF (IFLG3 .NE. 3) GO TO 1370                                      ISC18690
      L3 = 2                                                            ISC18700
      GO TO 1170                                                        ISC18710
C     STORE CARD SOURCE, HOLD TAPE SOURCE                              ISC18720
 1330 IF (DISP .LE. 0) GO TO 1340                                       ISC18730
      WRITE (JUNT,9029) NUMS1                                           ISC18740
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      GO TO 2490
 1340 IFLG3 =2
      GO TO 1280                                                          ISC18750
C     SAVE NO. OF SOURCES USED, FOR CORE SAVED RUN                        ISC18760
 1350 NSOURC = KSO                                                        ISC18770
      IF (ISW(5) .EQ. 0.OR.ISW(5) .EQ. 2) GO TO 2410                      ISC18780
C     WRITE END OF TAPE RECORD                                            ISC18790
      NSOR(1) = 999999                                                    ISC18800
      WRITE (NUNT) (NSOR(I),I=1,NSO)                                      ISC18810
      IF (ISW(15) .LT. 0) GO TO 1360                                      ISC18820
      ENDFILE NUNT                                                        ISC18830
      ENDFILE NUNT                                                        ISC18840
      BACKSPACE NUNT                                                      ISC18850
C     THIS BACKSPACE ASSUMES THE TAPE BACKSPACES OVER THE SECOND END OF   ISC18860
C     FILE MARK.                                                          ISC18870
 1360 CONTINUE                                                            ISC18880
C     SWITCH OUTPUT UNIT TO INPUT UNIT FOR ADDITIONAL PASSES              ISC18890
      NUNT = NUNT                                                         ISC18900
      ISW(14) = ISW(15)                                                   ISC18910
      ISW(5) = 2                                                          ISC18920
      GO TO 2410                                                          ISC18930
 1370 CONTINUE                                                            ISC18940
      IF (NOTAP .EQ. 0) GO TO 1400                                        ISC18950
      IF (KSO+1 .LE. 300) GO TO 1390                                      ISC18960
      IF (ISW(5) .EQ. 1.OR.ISW(5) .EQ. 3) GO TO 1380                      ISC18970
      IF (ISW(5) .EQ. 2.AND.NSOURC .EQ. 0) GO TO 1380                     ISC18980
      GO TO 680                                                           ISC18990
 1380 NOTAP = 0                                                           ISC19000
      GO TO 1400                                                          ISC19010
 1390 ISAVSO(KSO+1) = NUMS                                                ISC19020
 1400 CONTINUE                                                            ISC19030
C     PRINT SOURCE DATA                                                   ISC19040
      IF (ISW(6) .LE. 1) GO TO 1410                                       ISC19050
      CALL OUTPT(4,K,X,Y,CON,1)                                           ISC19060
 1410 CONTINUE                                                            ISC19070
      IF (ISW(5) .GE. 2.AND.ISW(12) .EQ. 1) GO TO 1420                    ISC19080
      IF (IFLG3 .EQ. 1.AND.DISP .EQ. 2) GO TO 2230                        ISC19090
      IF (IFLG3 .EQ. 3) GO TO 2230                                        ISC19100
 1420 CONTINUE                                                            ISC19110
      IF (NOTAP .EQ. 0) GO TO 1440                                        ISC19120
      IF (L9+NOTAP+NXYSEA .LE. IEND) GO TO 1440                           ISC19130
      IF (ISW(5) .EQ. 1.OR.ISW(5) .EQ. 3) GO TO 1430                      ISC19140
      IF (ISW(5) .EQ. 2.AND.NSOURC .EQ. 0) GO TO 1430                     ISC19150
      GO TO 1180                                                          ISC19160
 1430 NOTAP = 0                                                           ISC19170
      L9 = 0                                                              ISC19180
 1440 CONTINUE                                                            ISC19190
C                                                                        ISC19200
C     START PLUME RISE SECTION FOR STACKS, BRANCH FOR VOLUME AND AREAS.  ISC19210
C*************************************************************************ISC19220
      IF (ISW(4) .EQ. 0) ZS = 0.0                                         ISC19230
      NSW1 = 0                                                            ISC19240
      NSW2 = 0                                                            ISC19250
      DXP = DX                                                            ISC19260
      DYP = DY                                                            ISC19270
      IF (TYPE .GT. 0) GO TO 1720                                         ISC19280
C     CALCULATE CONSTANTS AND PARAMETERS FOR STACKS                       ISC19290
                                                                          ISC19300
                                                                          ISC19310
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      R = 0.5*D                                                          ISC19320
      R0 = 0                                                             ISC19330
      X0 = 0                                                             ISC19340
      SIGZOP = 0.0                                                       ISC19350
      DO 1450  I=1,NSTBLE                                                ISC19360
 1450 XY(I) = 0.0                                                        ISC19370
C     DETERMINE IF WAKE EFFECTS USED, JTYPE = 0 NO WAKE EFFECTS,         ISC19380
C     JTYPE = 1 SQUAT BUILDING, JTYPE = 2 TALL BUILDING                  ISC19390
      JTYPE = 0                                                          ISC19400
      IF (HB .LE. 0.0) GO TO 1460                                        ISC19410
      HW = 2.0*SQRT(BW*BW*.31830988)                                     ISC19420
      C1 = 2.5*HB                                                        ISC19430
      C2 = HW*1.5+HB                                                     ISC19440
      HMIN = AMIN1(C1,C2)                                                ISC19450
      IF (HW .GE. HB) GO TO 1460                                         ISC19460
      JTYPE = 2                                                          ISC19470
      GO TO 1470                                                         ISC19480
 1460 JTYPE = 1                                                          ISC19490
 1470 CONTINUE                                                           ISC19500
      HB2 = 2.0*HB                                                       ISC19510
      HB12 = 1.2*HB                                                      ISC19520
C     PLUME RISE EQUATION PARTS                                          ISC19530
 1480 C1 = VEL*R*R                                                       ISC19540
      C2 = C1*VEL                                                        ISC19550
      C1 = C1*G                                                          ISC19560
      HP = H                                                             ISC19570
      IF (HP .LT. ZRMIN) HP = ZRMIN                                      ISC19580
      C3 = HP*ZRI                                                        ISC19590
      C13 = 6.0*VEL*R                                                    ISC19600
      VELI = 1.0/VEL                                                     ISC19610
      C4 = 8.0*R*VELI                                                    ISC19620
C     CALC PARAMETERS FOR PLUME RISE                                     ISC19630
      NSW1 = 0                                                           ISC19640
      NSW2 = 0                                                           ISC19650
      VEL2D = 2.0*D*VEL                                                  ISC19660
      D3 = 3.0*D                                                         ISC19670
      DO 1610 I =1,NSTBLE                                                ISC19680
      DO 1610 J=1,NSPEED                                                 ISC19690
C     UBAR AT H                                                          ISC19700
      UBH = UBAR(J)*C3**P(J,I)                                           ISC19710
      UBHI(J,I) = 1.0/UBH                                                ISC19720
      HBRIG(J,I) = H                                                     ISC19730
      IF (ISW(20) .EQ. 1.AND.VEL .LT. 1.5*UBH) HBRIG(J,I) = H+VEL2D*UBHI ISC19740
     1(J,I)-D3                                                           ISC19750
      IF(HBRIG(J,I).LT.0.0) HBRIG(J,I)=0.0                               ISC19760
      C8 = C4*(VEL+3.0*UBH)**2*UBHI(J,I)                                 ISC19770
      C9 = G*DPDZ(J,I)                                                   ISC19780
      DO 1610 K=1,NSEASN                                                 ISC19790
      T = TS                                                             ISC19800
      IF (T .LE. 0.0) T = ABS(T)+TA(I,K)                                 ISC19810
      C11 = TA(I,K)/T                                                    ISC19820
C     BUOYANCY TERM                                                      ISC19830
      F = C1*(1.0-C11)                                                   ISC19840
      IF(F.LT.0.0) F=0.0                                                 ISC19850
C     MOMENTUM TERM                                                      ISC19860
      FM=C2*C11                                                          ISC19870
      BETAJ=1./3.+UBH*VELI                                               ISC19880
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      BETAJ=BETAJ*BETAJ                                                 ISC19890
      BETAJI=1./BETAJ                                                   ISC19900
      M = 4*(K-1)                                                       ISC19910
      S=C9/TA(I,K)                                                      ISC19920
      SSQ=SQRT(S)                                                       ISC19930
      SSQI=1./SSQ                                                       ISC19940
C     MPR1LT IS A SUBROUTINE THAT CALCULATES FINAL PLUME RISE           ISC19950
C     IN A MANNER CONSISTENT WITH THE MPTER MODEL.                      ISC19960
C     DELH(J,I,M+1) IS FINAL PLUME RISE.                                ISC19970
C     DELH(J,I,M+2) IS DISTANCE TO FINAL RISE.                          ISC19980
C     DELH(J,I,M+3) AND DELH(J,I,M+4) ARE FLAGS FOR                     ISC19990
C     BUILDING WAKE EFFECTS CALCULATIONS.                               ISC20000
      CALL MPR1LT(I,T,TA(I,K),F,D,VEL,UBH,DELH(J,I,M+1),                ISC20010
     1  DPDZ(J,I),DELH(J,I,M+2))                                        ISC20020
      DELH(J,I,M+3)=1.                                                  ISC20030
      DELH(J,I,M+4)=1.                                                  ISC20040
      IF (JTYPE .EQ. 0) GO TO 1600                                      ISC20050
C     CALC. PLUME RISE DUE TO MOMENTUM FOR WAKE EFFECTS CALCULATIONS    ISC20060
C     USING UNAMAP 5 ISC MOMENTUM RISE                                  ISC20070
      XB = HB2                                                          ISC20080
      IF(C9.GT.0.0) GO TO 1570                                          ISC20090
C     UNSTABLE CONDITIONS                                               ISC20100
C     CALCULATE MAX DOWNWIND DISTANCE                                   ISC20110
      IF(F.LE.0.) THEN                                                  ISC20120
      DMAX=4.*D*VELI*UBHI(J,I)*(VEL+3.*UBH)**2                          ISC20130
      ELSE                                                              ISC20140
      XSTAR=34.*F**.4                                                   ISC20150
      IF(F.LE.55.) XSTAR=14.*F**.625                                    ISC20160
      DMAX=3.5*XSTAR                                                    ISC20170
      ENDIF                                                             ISC20180
      IF(XB.GT.DMAX) XB=DMAX                                            ISC20190
      HP=3.*FM*XB*BETAJI*UBHI(J,I)*UBHI(J,I)                            ISC20200
      HP=HP**.33333333                                                  ISC20210
      GO TO 1580                                                        ISC20220
C     STABLE CONDITIONS                                                 ISC20230
 1570 DMAX=3.1415926*UBH*SSQI                                           ISC20240
      IF(F.LE.0.) DMAX=DMAX*.5                                          ISC20250
      IF(XB.GT.DMAX) XB=DMAX                                            ISC20260
      HP=3.*FM*BETAJI*UBHI(J,I)*SSQI*SIN(SSQ*XB*UBHI(J,I))              ISC20270
      HP=HP**.33333333                                                  ISC20280
C     HP1 IS MAX ISC MOMENTUM RISE                                      ISC20290
 1580 HP1=3.*VEL*D*UBHI(J,I)                                            ISC20300
      IF(HP.GT.HP1) HP=HP1                                              ISC20310
      HP=HP+H                                                           ISC20320
      IF (HP .GT. HMIN) GO TO 1590                                      ISC20330
      NSW1 = 1                                                          ISC20340
C     SET FLAG TO MODIFY SIGZ                                           ISC20350
      DELH(J,I,M+3) = -DELH(J,I,M+3)                                    ISC20360
      IF (HP .GT. HB12) GO TO 1600                                      ISC20370
C     SET FLAG TO MODIFY XY                                             ISC20380
      DELH(J,I,M+4) = -DELH(J,I,M+4)                                    ISC20390
      GO TO 1600                                                        ISC20400
 1590 NSW2 = 1                                                          ISC20410
 1600 CONTINUE                                                          ISC20420
 1610 CONTINUE                                                          ISC20430
      IF (NSW1 .EQ. 0) JTYPE = 0                                        ISC20440
      IF (NSW1 .EQ. 1.AND.NSW2 .EQ. 0) NSW2 = -1                        ISC20450
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      XMX = 0.0                                                          ISC20460
      IF (JTYPE .EQ. 0) GO TO 1770                                       ISC20470
C     WAKE EFFECTS COEFFICIENTS TO CALC SIGZ AND XY                      ISC20480
C     FOR DISTANCES LESS THAN 10HB (SQUAT) OR 10HW (TALL)                ISC20490
      HWOHB = HW/HB                                                      ISC20500
      C6 = HW                                                            ISC20510
      IF (JTYPE .EQ. 1) C6 = HB                                          ISC20520
      XMX = 3.0*C6                                                       ISC20530
C     COEFFICIENTS FOR SIGZ ( SIGZ = B1+B2*X )                           ISC20540
      B1 = 0.499*C6                                                      ISC20550
      B2 = 0.067                                                         ISC20560
C     COEFFICIENTS FOR XY ( XY = 2.15*SIGYO/COT(.5*DELTA THETA) )        ISC20570
C          (WHERE  SIGYO = B3+B4*X )                                     ISC20580
      B4 = 0.067                                                         ISC20590
      IF (JTYPE .EQ. 2) GO TO 1650                                       ISC20600
      IF (HWOHB .GT. 5) GO TO 1620                                       ISC20610
      B3 = 0.35*HW-0.201*HB                                              ISC20620
      GO TO 1660                                                         ISC20630
 1620 IF (WAKE .EQ. 1) GO TO 1640                                        ISC20640
C     SET FLAG TO PRINT MESSAGE THAT UPPER BOUND EQUATIONS USED          ISC20650
      IPR4 = 1                                                           ISC20660
 1630 CONTINUE                                                           ISC20670
      B3 = 0.49*HB                                                       ISC20680
      GO TO 1660                                                         ISC20690
 1640 B3 = 1.549*HB                                                      ISC20700
      GO TO 1660                                                         ISC20710
 1650 B3 = 0.149*HW                                                      ISC20720
 1660 CONTINUE                                                           ISC20730
C     FOR DISTANCES GREATER THAN OR EQUAL TO 10HB (SQUAT) OR 10HW (TALL)ISC20740
      SIGZOP = 1.2*C6                                                    ISC20750
      C7 = 10.0*C6                                                       ISC20760
      DO 1710 I=1,NSTBLE                                                 ISC20770
C     XZ IS DEPENDENT ON DISTANCE AND IS CALCULATED BELOW IN MAIN MODEL  ISC20780
C     CALCULATIONS                                                       ISC20790
C     CALC XY                                                            ISC20800
      IF (JTYPE .EQ. 2) GO TO 1690                                       ISC20810
      IF (HWOHB .GT. 5.0) GO TO 1670                                     ISC20820
      C5 = 0.35*HW+0.5*HB                                                ISC20830
      GO TO 1700                                                         ISC20840
 1670 IF (WAKE .EQ. 1) GO TO 1680                                        ISC20850
      C5 = 0.65*HB                                                       ISC20860
      GO TO 1700                                                         ISC20870
 1680 C5 = 2.25*HB                                                       ISC20880
      GO TO 1700                                                         ISC20890
 1690 C5 = 0.65*HW                                                       ISC20900
 1700 CONTINUE                                                           ISC20910
      IF(ISW(9) .NE. 4) XY(I)=VIRTY(C5*2.15,ISTBLE(I))-C7                ISC20920
      IF (ISW(9) .EQ. 4) XY(I)=XVY(C5*2.15,ISTBLE(I))-C7                 ISC20930
      IF (XY(I) .LT. 0.0) XY(I) = 0.0                                    ISC20940
 1710 CONTINUE                                                           ISC20950
      HB10 = C7                                                          ISC20960
      GO TO 1770                                                         ISC20970
C     VOLUME OR AREA EMISSIONS                                           ISC20980
C*******************************************************************ISC20990
C     CALCULATE CONSTANTS AND PARAMETERS FOR VOLUME AND AREA SOURCES.    ISC21000
C     CALCULATE INVERSE UBAR AT H                                        ISC21010
 1720 CONTINUE                                                           ISC21020
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      HP = H                                                                ISC21030
      IF (HP .LT. ZRMIN) HP = ZRMIN                                         ISC21040
      C3 = HP*ZRI                                                           ISC21050
      DO 1730 I=1,NSTBLE                                                    ISC21060
      DO 1730 J=1,NSPEED                                                    ISC21070
 1730 UBHI(J,I) = 1.0/(UBAR(J)*C3**P(J,I))                                  ISC21080
C     CALC EFFECTIVE AREA                                                   ISC21090
      X0 = BW*BW                                                            ISC21100
C     CALC EFFECTIVE RADIUS                                                 ISC21110
      R0 = SQRT(X0*.31830988)                                               ISC21120
      IF (TYPE .EQ. 2) GO TO 1750                                           ISC21130
C     VOLUME SOURCES (VIRTUAL DISTANCES)                                    ISC21140
      XMX = 001.0+2.15*SIGYO                                                ISC21150
      SIGZOP = SIGZO                                                        ISC21160
C     XZ = VIRTZ(SIGZOP,ISTBLE(I),XB) , XB = DISTANCE                       ISC21170
      DO 1740 I=1,NSTBLE                                                    ISC21180
      IF(ISW(9) .NE. 4) XY(I)=VIRTY(SIGYO,ISTBLE(I))                        ISC21190
      IF(ISW(9) .EQ. 4) XY(I)=XVY(SIGYO,ISTBLE(I))                          ISC21200
 1740 CONTINUE                                                              ISC21210
      GO TO 1770                                                            ISC21220
C     AREA SOURCES (VIRTUAL DISTANCES)                                      ISC21230
 1750 C9 = R0*THNI                                                          ISC21240
      DXP = DXP+0.5*BW                                                      ISC21250
      DYP = DYP+0.5*BW                                                      ISC21260
      XMX = 001.0+0.5*BW                                                    ISC21270
C     XZ = BW, WIDTH OF AREA SOURCE                                         ISC21280
      DO 1760 I=1,NSTBLE                                                    ISC21290
      XY(I) = C9                                                            ISC21300
 1760 CONTINUE                                                              ISC21310
C                                                                           ISC21320
C     ALL SOURCE TYPES MERGE HERE                                           ISC21330
C*************************************************************************ISC21340
 1770 C1 =   1.0                                                            ISC21350
C     MINIMUM CALCULATION DISTANCE                                          ISC21360
      XMX = AMAX1(XMX,C1)                                                   ISC21370
      IDP = 0                                                               ISC21380
      IF (NVS .GT. 0.OR.ISW(1) .EQ. 2) IDP = 1                              ISC21390
      C1 = PP1                                                              ISC21400
      IF (TYPE .EQ. 2) C1 = C1*X0                                           ISC21410
      IF (NVS .GT. 0.AND.ISW(1) .LE. 1) C1 = 0.5*C1                         ISC21420
      IF (IPR4 .EQ. 0) GO TO 1780                                           ISC21430
      JJ = 3                                                                ISC21440
      IF (ISW(6) .GE. 2) JJ = 1                                             ISC21450
      CALL TITLR(3,JJ,0)                                                    ISC21460
      WRITE (JUNT,9030) NUMS                                                ISC21470
 1780 CONTINUE                                                              ISC21480
      IF (ISW(4) .EQ. 0) ZS = 0.0                                           ISC21490
C                                                                           ISC21500
C     LOOP OVER Y GRID COORDINATES                                          ISC21510
C*************************************************************************ISC21520
      IF (NYPNTS .LE. 0) GO TO 1850                                         ISC21530
      IKSW = 1                                                              ISC21540
      JJ = 0                                                                ISC21550
 1790 JJ = JJ+1                                                             ISC21560
      IF (JJ .GT. NYPNTS) GO TO 1850                                        ISC21570
      JJJ = (JJ-1)*NXPNTS                                                   ISC21580
      IF (ISW(2) .GT. 1) GO TO 1800                                         ISC21590
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      YP = Y(JJ)-DYP                                                    ISC21600
      GO TO 1810                                                        ISC21610
 1800 YC = Y(JJ)*RADIAN                                                 ISC21620
      YS = SIN(YC)                                                      ISC21630
      YC = COS(YC)                                                      ISC21640
 1810 CONTINUE                                                          ISC21650
C                                                                       ISC21660
C     LOOP OVER X GRID COORDINATES                                      ISC21670
C***********************************************************************ISC21680
      II = 0                                                            ISC21690
 1820 II = II+1                                                         ISC21700
      IF (II .GT. NXPNTS) GO TO 1790                                    ISC21710
      IF (ISW(2) .GT. 1) GO TO 1830                                     ISC21720
      XP = X(II)-DXP                                                    ISC21730
      GO TO 1840                                                        ISC21740
 1830 YP = X(II)*YC-DYP                                                 ISC21750
      XP = X(II)*YS-DXP                                                 ISC21760
 1840 IJ = JJJ+II                                                       ISC21770
      GO TO 1900                                                        ISC21780
C                                                                       ISC21790
C     LOOP OVER SPECIAL CALCULATION POINTS (RECEPTORS)                  ISC21800
C***********************************************************************ISC21810
 1850 IKSW = 2                                                          ISC21820
      IF (NXWYPT .LE. 0) GO TO 2230                                     ISC21830
      IJ = NXXYY                                                        ISC21840
 1860 IJ = IJ+1                                                         ISC21850
      IF (IJ .GT. NXXYYP) GO TO 2230                                    ISC21860
      JJ = IJ+NYPSS                                                     ISC21870
      II = IJ+NXPSS                                                     ISC21880
      IF (ISW(12) .NE. 1) GO TO 1880                                    ISC21890
      IF (X(II)) 1880,1870,1880                                         ISC21900
 1870 IF (Y(JJ)) 1880,1860,1880                                         ISC21910
 1880 CONTINUE                                                          ISC21920
      IF (ISW(3) .GT. 1) GO TO 1890                                     ISC21930
      YP = Y(JJ)-DYP                                                    ISC21940
      XP = X(II)-DXP                                                    ISC21950
      GO TO 1900                                                        ISC21960
 1890 YC = Y(JJ)*RADIAN                                                 ISC21970
      YS = SIN(YC)                                                      ISC21980
      YC = COS(YC)                                                      ISC21990
      YP = X(II)*YC-DYP                                                 ISC22000
      XP = X(II)*YS-DXP                                                 ISC22010
 1900 CONTINUE                                                          ISC22020
      DO 1910 K=1,NSEASN                                                ISC22030
      L1 = (K+L91)*NXXYYP+L9                                            ISC22040
 1910 CON(L1+IJ) = 0.0                                                  ISC22050
      ZP = 0.0                                                          ISC22060
      IF (ISW(4) .NE. 0) ZP = Z(IJ)                                     ISC22070
C     ALLOW TREATMENT OF RECEPTORS WITH ELEVATIONS BELOW                ISC22080
C     PLANT GRADE IN THE SAME MANNER AS ABOVE PLANT GRADE.              ISC22090
      IF(TYPE.EQ.2) ZP=ZS                                               ISC22100
      IF (TYPE .EQ. 2.OR.ZP .LE. H+ZS) GO TO 1920                       ISC22110
C     CODE MODIFIED BY TRC TO ALLOW FOR TERRAIN                         ISC22120
C     TRUNCATION WHEN RECEPTOR ELEVATION IS ABOVE                       ISC22130
C     SOURCE ELEVATION PLUS SOURCE HEIGHT.                              ISC22140
      ZP=ZS+H-.005                                                      ISC22150
 1920 CONTINUE                                                          ISC22160
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      ZSMZP = ZS-ZP                                                     ISC22170
C     SEE IF SOURCE AND POINT ARE TOO CLOSE                             ISC22180
      RD = SQRT(XP*XP+YP*YP)                                            ISC22190
      IF (RD .GE. XMX) GO TO 1930                                       ISC22200
      N = 3                                                             ISC22210
      IF (ISW(6) .GE. 2) N = 1                                          ISC22220
      CALL TITLR(1,N,0)                                                 ISC22230
      WRITE (JUNT,9025) NUMS,X(II),Y(JJ)                                ISC22240
      GO TO 2220                                                        ISC22250
 1930 CONTINUE                                                          ISC22260
C                                                                       ISC22270
C     LOOP OVER WIND DIRECTION SECTORS (CATEGORIES)                     ISC22280
C***********************************************************************ISC22290
      DO 2210 N=1,NSCTOR                                                ISC22300
C     CALC DOWNWIND AND CROSSWIND DISTANCES FROM SOURCE TO RECEPTOR     ISC22310
      XB = -XP*PHS(N)-YP*PHC(N)                                         ISC22320
      YB = XP*PHC(N)-YP*PHS(N)                                          ISC22330
C     IF POINT UPWIND OF SOURCE NO CALC                                 ISC22340
      IF (XB .LE. 0.0) GO TO 2210                                       ISC22350
      IF (TYPE .EQ. 1) GO TO 1950                                       ISC22360
      IF (TYPE .EQ. 2) GO TO 1940                                       ISC22370
C     STACK EMISSIONS                                                   ISC22380
      IF (JTYPE .EQ. 0) GO TO 1940                                      ISC22390
C     PRECALC WAKE EFFECTS IF XB < HB10                                 ISC22400
      IF (XB .GE. HB10) GO TO 1950                                      ISC22410
      SIGZ1 = B1+XB*B2                                                  ISC22420
      XYP1 = XYPU*(B3+XB*B4)                                            ISC22430
      SIGIP1 = 1.0/SIGZ1                                                ISC22440
      SIGZI1 = -0.5*SIGIP1*SIGIP1                                       ISC22450
      GO TO 1950                                                        ISC22460
C     AREA SOURCES AND STACKS WITHOUT WAKE EFFECTS                      ISC22470
 1940 C2 = C1                                                           ISC22480
      XYP = XY(1)                                                       ISC22490
C     CALC DIST AND SMOOTHING TERM FOR AREA SOURCES AND STACKS WITH     ISC22500
C     NO WAKE EFFECTS                                                   ISC22510
      CALL DISTR                                                        ISC22520
      IF (ARG .LT. 0.0) GO TO 2210                                      ISC22530
      C3 = C2*ARG                                                       ISC22540
      IF (ISW(1) .EQ. 2) C3 = C3*RPI                                    ISC22550
 1950 CONTINUE                                                          ISC22560
C                                                                       ISC22570
C     BEGIN LOOP OVER STABILITY FOR MAIN MODEL CALCULATIONS             ISC22580
C***********************************************************************ISC22590
      DO 2200 I=1,NSTBLE                                                ISC22600
      KK = 4*(I-1)                                                      ISC22610
      IF (TYPE .NE. 1) GO TO 1960                                       ISC22620
      XYP = XY(I)                                                       ISC22630
C     CALC DIST AND SMOOTHING TERM FOR VOLUME SOURCES                   ISC22640
      CALL DISTR                                                        ISC22650
      IF (ARG .LT. 0.0) GO TO 2200                                      ISC22660
      C3 = C1*ARG                                                       ISC22670
      IF (ISW(1) .EQ. 2) C3 = C3*RPI                                    ISC22680
 1960 CONTINUE                                                          ISC22690
C     CALC SIGZ FOR VOLUME, AREA AND STACKS WITHOUT WAKE EFFECTS        ISC22700
      IF (TYPE .NE. 0.OR.JTYPE.EQ. 0.OR.XB .GE. HB10) GO TO 1970        ISC22710
      XZ = 0.0                                                          ISC22720
      GO TO 1990                                                        ISC22730
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 1970 CONTINUE                                                          ISC22740
      IF (NSW2 .LT. 0) GO TO 2000                                       ISC22750
      XZ = 0.0                                                          ISC22760
      IF (TYPE .EQ. 0) GO TO 1990                                       ISC22770
      IF (TYPE .EQ. 2) GO TO 1980                                       ISC22780
      IF(ISW(9) .NE. 4) XZ=VIRTZ(SIGZOP,ISTBLE(I),XB,0.0)               ISC22790
      IF(ISW(9) .EQ. 4) XZ=XVZ(SIGZOP,ISTBLE(I))                        ISC22800
      GO TO 1990                                                        ISC22810
 1980 XZ = BW                                                           ISC22820
 1990 CONTINUE                                                          ISC22830
      IF(ISW(9) .NE. 4) SIGZ=SIGMAZ(XB+XZ,ISTBLE(I))                    ISC22840
      IF(ISW(9) .EQ. 4) CALL URBNYZ(XB+XZ,ISTBLE(I),DUMSY,SIGZ)         ISC22850
      SIGZIP = 1.0/SIGZ                                                 ISC22860
      SIGZI = -0.5*SIGZIP*SIGZIP                                        ISC22870
      IF (TYPE .GT. 0.OR.JTYPE .EQ. 0) GO TO 2010                       ISC22880
      SIGZ2 = SIGZ                                                      ISC22890
      SIGIP2 = SIGZIP                                                   ISC22900
      SIGZI2 = SIGZI                                                    ISC22910
 2000 IF (XB .LT. HB10) GO TO 2010                                      ISC22920
C     WAKE EFFECTS MODIFICATIONS FOR DIST. GREATER THAN OR EQUAL TO 10HBISC22930
      IF(ISW(9) .NE. 4) GOTO 2005                                       ISC22940
      XZ=XVZ(SIGZOP,ISTBLE(I))                                          ISC22950
      CALL URBNYZ(XB+XZ,ISTBLE(I),DUMSY,SIGZ1)                          ISC22960
      GOTO 2007                                                         ISC22970
 2005 XZ=VIRTZ(SIGZOP,ISTBLE(I),XB,HB10)                                ISC22980
      SIGZ1 = SIGMAZ(XB+XZ,ISTBLE(I))                                   ISC22990
 2007 CONTINUE                                                          ISC23000
      XYP1 = XY(I)                                                      ISC23010
      SIGIP1 = 1.0/SIGZ1                                                ISC23020
      SIGZI1 = -0.5*SIGIP1*SIGIP1                                       ISC23030
 2010 CONTINUE                                                          ISC23040
      IF (ISW(1) .EQ. 2) BBAR=FUNCT(XB,ISTBLE(I),ISW(9))                ISC23050
C     DEFINE OLD SIGZ FOR BID CALCULATION                               ISC23060
      IF(TYPE.EQ.0) SZOLD=SIGZ                                          ISC23070
C                                                                       ISC23080
C     BEGIN LOOP OVER SEASONS FOR MAIN MODEL CALCULATIONS               ISC23090
C*************************************************************************ISC23100
      DO 2190 K=1,NSEASN                                                ISC23110
      M = 4*(K-1)                                                       ISC23120
      KN = KK+K                                                         ISC23130
      L1 = (K+L91)*NXXYYP+L9                                            ISC23140
C                                                                       ISC23150
C     BEGIN LOOP OVER WIND SPEED FOR MAIN MODEL CALCULATIONS            ISC23160
C*************************************************************************ISC23170
      DO 2180 J=1,NSPEED                                                ISC23180
      C4 = 0.0                                                          ISC23190
      IF (FREQ(J,N,KN) .LE. 0.0) GO TO 2180                             ISC23200
      HP = H                                                            ISC23210
      IF (TYPE .GT. 0) GO TO 2090                                       ISC23220
C     SET SIGZ = OLD SIGZ FOR BID CALCULATION                           ISC23230
      SIGZ=SZOLD                                                        ISC23240
      IF (JTYPE .EQ. 0) GO TO 2060                                      ISC23250
C     STACK EMISSIONS WITH WAKE EFFECTS                                 ISC23260
      IF (DELH(J,I,M+3) .GE. 0.0) GO TO 2040                            ISC23270
C     USE MODIFIED SIGZ                                                 ISC23280
      IF (XB .GE. HB10) GO TO 2020                                      ISC23290
      IF (SIGZ1 .GE. SICZ2) GO TO 2020                                  ISC23300
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      SIGZ = SIGZ2                                                      ISC23310
      SIGZIP = SIGIP2                                                   ISC23320
      SIGZI = SIGZI2                                                    ISC23330
      GO TO 2030                                                        ISC23340
 2020 CONTINUE                                                          ISC23350
      SIGZ = SIGZ1                                                      ISC23360
      SIGZIP = SIGIP1                                                   ISC23370
      SIGZI = SIGZI1                                                    ISC23380
 2030 XYP = 0.0                                                         ISC23390
      IF (DELH(J,I,M+4) .GE. 0.0) GO TO 2050                            ISC23400
C     USE MODIFIED XY                                                   ISC23410
      XYP = XYP1                                                        ISC23420
      GO TO 2050                                                        ISC23430
C     UNMODIFIED SIGZ AND XY                                            ISC23440
 2040 SIGZ = SIGZ2                                                      ISC23450
      XYP = 0.0                                                         ISC23460
      SIGZIP = SIGIP2                                                   ISC23470
      SIGZI = SIGZI2                                                    ISC23480
 2050 CONTINUE                                                          ISC23490
C     CALC DIST AND SMOOTHING TERM FOR STACKS WITH WAKE EFFECTS         ISC23500
      CALL DISTR                                                        ISC23510
      IF (ARG .LE. 0.0) GO TO 2180                                      ISC23520
      C3 = C1*ARG                                                       ISC23530
      IF (ISW(1) .EQ. 2) C3 = C3*RPI                                    ISC23540
C     CALCULATE TRANSITIONAL PLUME RISE                                 ISC23550
 2040 C7 = XB                                                           ISC23560
      C7A=XB                                                            ISC23570
      XKM=C7*.001                                                       ISC23580
C     HSAV IS MPTER FINAL PLUME RISE                                    ISC23590
      HSAV=DELH(J,I,M+1)                                                ISC23600
      IF(XKM.GT.DELH(J,I,M+2).AND.DELH(J,I,M+3).GT.0..AND.              ISC23610
     X  DELH(J,I,M+4).GT.0.) GO TO 2070                                 ISC23620
      IF(ISW(19).EQ.0.AND.ISW(21).NE.0.AND.DELH(J,I,M+3).GT.0.          ISC23630
     X  .AND.DELH(J,I,M+4).GT.0.) GO TO 2070                           ISC23640
      F=G*VEL*D*D*.25*(1.-TA(I,K)/T)                                    ISC23650
      IF(F.LT.0.0) F=0.0                                                ISC23660
C     CALCULATE MPTER TRANSITIONAL PLUME RISE                           ISC23670
      HP=160.*F**.333333*XKM**.666667*UBHI(J,I)                         ISC23680
      IF(HP.GT.HSAV) HP=HSAV                                            ISC23690
      HSAV=HP                                                           ISC23700
C     IF BUILDING WAKE EFFECTS USED, CALCULATE UNAMAP 5                 ISC23710
C     ISC DISTANCE DEPENDENT MOMENTUM RISE                              ISC23720
      IF(DELH(J,I,M+3).LE.0..OR.DELH(J,I,M+4).LE.0.) THEN               ISC23730
      C9A=G*DPOZ(J,I)                                                   ISC23740
      UBHA=1./UBHI(J,I)                                                 ISC23750
      BETAJ=1./3.+UBHA*VELI                                             ISC23760
      BETAJ=BETAJ*BETAJ                                                 ISC23770
      BETAJI=1./BETAJ                                                   ISC23780
      FM=TA(I,K)/TS*VEL*VEL*D*D*.25                                     ISC23790
      IF(C9A.GT.0.0) GO TO 2062                                         ISC23800
C     UNSTABLE CONDITIONS                                               ISC23810
C     CALCULATE MAX DOWNWIND DISTANCE                                   ISC23820
      IF(F.LE.0.) THEN                                                  ISC23830
      DMAX=4.*D*VELI*UBHI(J,I)*(VEL+3.*UBHA)**2                         ISC23840
      ELSE                                                              ISC23850
      XSTAR=34.*F**.4                                                   ISC23860
      IF(F.LE.55.) XSTAR=14.*F**.625                                    ISC23870
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      DMAX=3.5*XSTAR                                                    ISC23880
      ENDIF                                                             ISC23890
      IF(C7A.GT.DMAX) C7A=DMAX                                          ISC23900
      HP=3.*FM*C7A*BETAJI*UBHI(J,I)*UBHI(J,I)                           ISC23910
      HP=HP**.33333333                                                  ISC23920
      GO TO 2064                                                        ISC23930
C     STABLE CONDITIONS                                                 ISC23940
 2062 S=C9A/TA(I,K)                                                     ISC23950
      SSQ=SQRT(S)                                                       ISC23960
      SSQI=1./SSQ                                                       ISC23970
C      CALCULATE MAX DOWNWIND DISTANCE                                  ISC23980
      DMAX=3.1415926*UBHA*SSQI                                          ISC23990
      IF(F.EQ.0.) DMAX=DMAX*.5                                          ISC24000
      IF(C7A.GT.DMAX) C7A=DMAX                                          ISC24010
      HP=3.*FM*BETAJI*UBHI(J,I)*SSQI*SIN(SSQ*C7A*UBHI(J,I))             ISC24020
      HP=HP**.33333333                                                  ISC24030
C     HP1 IS MAX ISC MOMENTUM RISE                                      ISC24040
 2064 HP1=3.*VEL*D*UBHI(J,I)                                            ISC24050
      IF(HP.GT.HP1) HP=HP1                                              ISC24060
C     USE LARGER OF ISC MOMENTUM RISE OR MPTER                          ISC24070
C     TRANISTIONAL RISE                                                 ISC24080
      IF(HSAV.LT.HP) HSAV=HP                                            ISC24090
      ENDIF                                                             ISC24100
      IF(ISW(19).EQ.0.AND.DELH(J,I,M+3).GT.0.                           ISC24110
     X  .AND.DELH(J,I,M+4).GT.0.) GO TO 2070                            ISC24120
      HP=HSAV+HBRIG(J,I)                                                ISC24130
      GO TO 2090                                                        ISC24140
 2070 HP=DELH(J,I,M+1)+HBRIG(J,I)                                       ISC24150
 2090 CONTINUE                                                          ISC24160
      IF(TYPE.GT.0) GO TO 2095                                          ISC24170
      IF(ISW(21).NE.0) GO TO 2095                                       ISC24180
      DUM=HSAV/3.5                                                      ISC24190
      DUM=DUM*DUM                                                       ISC24200
      SIGZ=SQRT(SIGZ*SIGZ+DUM)                                          ISC24210
      SIGZIP=1/SIGZ                                                     ISC24220
      SIGZI=-.5*SIGZIP*SIGZIP                                           ISC24230
 2095 CONTINUE                                                          ISC24240
C     ADJUST PLUME FOR ELEVATION                                        ISC24250
      HP = HP+ZSMZP                                                     ISC24260
C     IF PLUME OUT OF MIXING LAYER NO CALC.                             ISC24270
C     CHECK FOR PLUME HEIGHT GREATER THAN MIXING HEIGHT                 ISC24280
C     AT SOURCE.                                                        ISC24290
      IF((HP-ZSMZP).GT.HM(J,I,K)) GO TO 2180                            ISC24300
      HMP = HM(J,I,K)                                                   ISC24310
      C4 = C3*Q(J,I,K)*FREQ(J,M,KN)*SIGZIP                              ISC24320
      IF (ISW(1) .LE. 1) C4 = C4*UBHI(J,I)                              ISC24330
C     DEPLETION DUE TO TIME DEPENDENT DECAY                             ISC24340
      IF (DECAY .LE. 0.0) GO TO 2100                                    ISC24350
      C7 = RP                                                           ISC24360
      IF (TYPE .EQ. 2) C7 = RP-R0                                       ISC24370
      C4 = C4*EXP(-DECAY*C7*UBHI(J,I))                                  ISC24380
 2100 CONTINUE                                                          ISC24390
C     CALC VERTICAL TERM                                                ISC24400
      IF (ISW(1) .EQ. 2) GO TO 2140                                     ISC24410
      IF (NVS .GT. 0) GO TO 2110                                        ISC24420
C     CONCENTRATION ONLY                                                ISC24430
      CALL VERTC1                                                       ISC24440
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      GO TO 2160                                                          ISC24450
 2110 CONTINUE                                                            ISC24460
      C7 = RP*UBHI(J,I)                                                   ISC24470
      VV = 0.0                                                            ISC24480
      DO 2120 IL=1,NVS                                                    ISC24490
      VSROU = C7*VS(IL)                                                   ISC24500
C     CONCENTRATION WITH DEPLETION DUE TO GRAVITATIONAL DEPOSITION        ISC24510
      CALL VERTC2(GAMMA(IL))                                              ISC24520
      VV = VV+V*FRQ(IL)                                                   ISC24530
 2120 CONTINUE                                                            ISC24540
 2130 V = VV                                                              ISC24550
      GO TO 2160                                                          ISC24560
 2140 CONTINUE                                                            ISC24570
      VV = 0.0                                                            ISC24580
      C7 = RP*UBHI(J,I)                                                   ISC24590
      DO 2150 IL=1,NVS                                                    ISC24600
      VSROU = C7*VS(IL)                                                   ISC24610
C     GRAVITATIONAL DEPOSITION                                            ISC24620
      CALL VERTC3(GAMMA(IL))                                              ISC24630
      VV = VV+(1.0-GAMMA(IL))*FRQ(IL)*V                                   ISC24640
 2150 CONTINUE                                                            ISC24650
      GO TO 2130                                                          ISC24660
 2160 CONTINUE                                                            ISC24670
      C4 = C4*V                                                           ISC24680
C                                                                         ISC24690
C     ACCUMULATE CONCENTRATION OR DEPOSITION                              ISC24700
      CON(L1+IJ) = CON(L1+IJ)+C4                                          ISC24710
C                                                                         ISC24720
C     END LOOP OVER WIND SPEED                                            ISC24730
 2170 CONTINUE                                                            ISC24740
 2180 CONTINUE                                                            ISC24750
C*************************************************************************ISC24760
C                                                                         ISC24770
C     END LOOP OVER SEASONS                                               ISC24780
 2190 CONTINUE                                                            ISC24790
C*************************************************************************ISC24800
C                                                                         ISC24810
C     END LOOP OVER STABILITY                                             ISC24820
 2200 CONTINUE                                                            ISC24830
C*************************************************************************ISC24840
C                                                                         ISC24850
C     END LOOP OVER WIND DIRECTION SECTORS                                ISC24860
 2210 CONTINUE                                                            ISC24870
C*************************************************************************ISC24880
C                                                                         ISC24890
C     END LOOP OVER X,Y AXIS POINTS AND SPECIAL RECEPTOR POINTS           ISC24900
 2220 CONTINUE                                                            ISC24910
      GO TO (1820,1860),IKSW                                              ISC24920
C*************************************************************************ISC24930
 2230 CONTINUE                                                            ISC24940
C                                                                         ISC24950
C     START SECTION TO OUTPUT INDIVIDUAL SOURCES AND ACCUMULATE FOR THE   ISC24960
C     TOTAL SUM OF SOURCES.                                               ISC24970
C                                                                         ISC24980
C     IS TAPE OUTPUT DESIRED                                              ISC24990
 2240 IF (ISW(5) .EQ. 0.OR.ISW(5) .EQ. 2) GO TO 2260                      ISC25000
C     OUTPUT SOURCE RECORD                                                ISC25010
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      WRITE (NUNT) (NSOR(I),I=1,NSO)                                    ISC25020
      NT = NT+1                                                         ISC25030
      ITSAVE(NT) = NUMS*10+TYPE                                         ISC25040
      IF (NT .GE. NTT) CALL OUTPT(-4,NT,X,Y,Z,NTT)                      ISC25050
C     OUTPUT CONCENTRATION (DEPOSITION) RECORD(S)                       ISC25060
      DO 2250 K=1,NSEASN                                                ISC25070
      L1 = (K+L91)*NXXYYP+L9                                            ISC25080
      WRITE (NUNT) (CON(L1+I),I=1,NXXYYP)                               ISC25090
 2250 CONTINUE                                                          ISC25100
 2260 CONTINUE                                                          ISC25110
C     IF SOURCE PART OF THIS COMBINED SOURCE GROUP USE IT               ISC25120
      IF (NOCOMB(NG) .EQ. 0) GO TO 2270                                 ISC25130
      CALL CHECKR(0,J)                                                  ISC25140
      IF (J .NE. 0) GO TO 2270                                          ISC25150
C     J = 0 IS NOT PART OF COMBINED, = 1 YES PART OF COMBINED           ISC25160
      GO TO 2380                                                        ISC25170
 2270 CONTINUE                                                          ISC25180
C                                                                       ISC25190
C     ACCUMULATE TOTAL CONCENTRATION (DEPOSITION) OVER SELECTED SOURCES ISC25200
C     AND PRINT IF DESIRED                                              ISC25210
      NT4 = 1                                                           ISC25220
      KK = 1                                                            ISC25230
      DO 2320 K=1,NSEASN                                                ISC25240
      L1 = (K+L91)*NXXYYP+L9                                            ISC25250
      IF (ISW(11) .EQ. 2) GO TO 2290                                    ISC25260
      IF (ISW(8) .EQ. 2.OR.ISW(7) .EQ. 2) GO TO 2280                    ISC25270
C     PRINT INDIVIDUAL SOURCES - SEASONAL                               ISC25280
      CALL OUTPT(KK,K,X,Y,CON(L1+1),1)                                  ISC25290
 2280 IF (ISW(8) .EQ. 1.AND.ISW11 .NE. 2) GO TO 2300                    ISC25300
C     ACCUMULATE FOR SUM OF SOURCES                                     ISC25310
 2290 L2 = (K-1)*NXXYYP                                                 ISC25320
      IF (L92 .EQ. 1) L2 = L2+NXXYYP                                    ISC25330
      CALL SUMMER(CON(L2+1),CON(L1+1),K+1)                              ISC25340
      IF (ISW(11) .EQ. 2) GO TO 2320                                    ISC25350
 2300 CONTINUE                                                          ISC25360
      IF (ISW(8) .EQ. 2.OR.ISW(7) .EQ. 1) GO TO 2320                    ISC25370
      IF (L92 .EQ. 2) GO TO 2310                                        ISC25380
      L2 = 0                                                            ISC25390
      IF (L92 .EQ. 0) L2 = (1+L91)*NXXYYP+L9                            ISC25400
      IF (L2 .NE. 0.AND.K .EQ. 1) GO TO 2320                            ISC25410
      CALL SUMMER(CON(L2+1),CON(L1+1),K)                                ISC25420
      GO TO 2320                                                        ISC25430
 2310 CALL SUMMER(Z,CON(L1+1),K)                                        ISC25440
 2320 CONTINUE                                                          ISC25450
      IF (ISW(11) .EQ. 2) GO TO 2360                                    ISC25460
      IF (ISW(8) .EQ. 2.OR.ISW(7) .EQ. 1) GO TO 2360                    ISC25470
      IF (ISW(1) .EQ. 2) GO TO 2340                                     ISC25480
      IF (L92 .EQ. 2) GO TO 2330                                        ISC25490
      L2 = 0                                                            ISC25500
      IF (L92 .EQ. 0) L2 = (1+L91)*NXXYYP+L9                            ISC25510
      CALL SUMMER(CON(L2+1),CON,-1)                                     ISC25520
      GO TO 2340                                                        ISC25530
 2330 CALL SUMMER(Z,CON,-1)                                             ISC25540
 2340 CONTINUE                                                          ISC25550
      KK = 2                                                            ISC25560
C     PRINT INDIVIDUAL SOURCES - ANNUAL                                 ISC25570
      IF (L92 .EQ. 2) GO TO 2350                                        ISC25580
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      CALL OUTPT(KK,K,X,Y,CON(L2+1),1)                                  ISC25590
      GO TO 2360                                                        ISC25600
 2350 CALL OUTPT(KK,K,X,Y,Z,1)                                          ISC25610
 2360 CONTINUE                                                          ISC25620
C     INCREMENT SOURCE SAVE NUMBERS FOR INTERNAL STORAGE OF SOURCES     ISC25630
      IF (NOTAP .EQ. 0) GO TO 2400                                      ISC25640
 2370 KSO = KSO+1                                                       ISC25650
      L9 = KSO*NXYSEA                                                   ISC25660
      GO TO 2400                                                        ISC25670
 2380 IF (NG .EQ. 1.AND.ISW(12) .GE. 0) GO TO 2390                      ISC25680
      J = NOCOMB(NG)                                                    ISC25690
      IF (NUMS .GT. IABS(IDSORC(J+NGT))) GO TO 2410                     ISC25700
 2390 IF (NOTAP .EQ. 0) GO TO 2400                                      ISC25710
      IF (NG .GT. 1.OR.ISW(12) .EQ. -1) GO TO 2370                      ISC25720
      CALL CHECKR(NGROUP,J)                                             ISC25730
      IF (J .NE. 0) GO TO 2370                                          ISC25740
 2400 CONTINUE                                                          ISC25750
      GO TO 790                                                         ISC25760
C                                                                       ISC25770
C     END LOOP OVER SOURCES, RETURN FOR NEXT SOURCE                     ISC25780
C*********************************************************************ISC25790
C                                                                       ISC25800
C     BEGIN OUTPUT FOR COMBINED SOURCES                                 ISC25810
 2410 IF (ISW(8) .EQ. 1.AND.ISW(11) .NE. 2) GO TO 2480                  ISC25820
      NT4 = 1                                                           ISC25830
      KK = 1                                                            ISC25840
      DO 2440 K=1,NSEASN                                                ISC25850
      L1 = (K-1)*NXXYYP                                                 ISC25860
      IF (L92 .EQ. 1) L1 = L1+NXXYYP                                    ISC25870
      IF (ISW(7) .EQ. 2) GO TO 2420                                     ISC25880
C     PRINT SUM OF SOURCES - SEASONAL                                   ISC25890
      CALL OUTPT(KK,K,X,Y,CON(L1+1),2)                                  ISC25900
 2420 IF (ISW(7) .LE. 1) GO TO 2440                                     ISC25910
      IF (L92 .EQ. 2) GO TO 2430                                        ISC25920
      CALL SUMMER(CON,CON(L1+1),K)                                      ISC25930
      GO TO 2440                                                        ISC25940
 2430 CALL SUMMER(Z,CON(L1+1),K)                                        ISC25950
 2440 CONTINUE                                                          ISC25960
      IF (ISW(7) .LE. 1) GO TO 2480                                     ISC25970
      IF (ISW(1) .EQ. 2) GO TO 2460                                     ISC25980
      IF (L92 .EQ. 2) GO TO 2450                                        ISC25990
      CALL SUMMER(CON,CON,-1)                                           ISC26000
      GO TO 2460                                                        ISC26010
 2450 CALL SUMMER(Z,CON,-1)                                             ISC26020
 2460 CONTINUE                                                          ISC26030
      KK = 2                                                            ISC26040
C     PRINT SUM OF SOURCES - ANNUAL                                     ISC26050
      IF (L92 .EQ. 2) GO TO 2470                                        ISC26060
      CALL OUTPT(KK,K,X,Y,CON,2)                                        ISC26070
      GO TO 2480                                                        ISC26080
 2470 CALL OUTPT(KK,K,X,Y,Z,2)                                          ISC26090
 2480 CONTINUE                                                          ISC26100
C                                                                       ISC26110
C     END OF COMBINED SOURCES, IF ISW(11) = 2 GO DO SECOND PASS FOR     ISC26120
C     DISPLAY OF MAXIMA. OTHERWISE GO TO NEXT GROUP OF COMBINED SOURCES ISC26130
      ISW(6) = 0                                                        ISC26140
      IF (ISW(11) .EQ. 2) GO TO 710                                     ISC26150
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      GO TO 700                                                          ISC26160
C                                                                        ISC26170
C     END OF COMBINED SOURCES LOOP                                       ISC26180
C     ***************************************************************** ISC26190
C                                                                        ISC26200
C     ERRORS COME TO HERE                                                ISC26210
 2490 IF (ISW(5) .LE. 0.OR.ISW(5) .EQ. 2) GO TO 2500                     ISC26220
      IF (IFLG2 .NE. 0) GO TO 2500                                       ISC26230
      IF (NG .GT. 1.OR.ISW(12) .EQ. -1) GO TO 2500                       ISC26240
C     WRITE END OF TAPE RECORD                                           ISC26250
      NSOR(1) = 999999                                                   ISC26260
      WRITE (NUNT) (NSOR(I),I-1,NSO)                                     ISC26270
      IF (ISW(15) .LT. 0) GO TO 2500                                     ISC26280
      ENDFILE NUNT                                                       ISC26290
      ENDFILE NUNT                                                       ISC26300
C                                                                        ISC26310
C     END OF PROG. CLOSE ACTIVE FILES                                    ISC26320
C     ***************************************************************** ISC26330
 2500 IF (NT .GT. 0) CALL OUTPT(-4,NT,X,Y,Z,NTT)                         ISC26340
      WRITE (JUNT,9024) K1                                               ISC26350
      IF (JUNT .EQ. 6.OR.INDFL .EQ. 1) GO TO 2510                        ISC26360
      ENDFILE JUNT                                                       ISC26370
      ENDFILE JUNT                                                       ISC26380
 2510 CONTINUE                                                           ISC26390
      STOP                                                               ISC26400
 9001 FORMAT (20A4)                                                      ISC26410
 9002 FORMAT (8F10.0)                                                    ISC26420
 9003 FORMAT (/54H **** ERROR - NUMBER OF SE`TLING VELOCITIES FOR SOURCE ISC26430
     1,I7,49H IS ZERO, MUST INPUT FOR GRAVITATIONAL DEPOSITION)          ISC26440
 9004 FORMAT (10X,19HNUMBER OF SOURCES =,I4/                             ISC26450
     210X,37HNUMBER OF X AXIS GRID SYSTEM POINTS =,I5/                   ISC26460
     310X,37HNUMBER OF Y AXIS GRID SYSTEM POINTS =,I5/                   ISC26470
     410X,26HNUMBER OF SPECIAL POINTS =,I5/                              ISC26480
     510X,19HNUMBER OF SEASONS =,I4/                                     ISC26490
     610X,30HNUMBER OF WIND SPEED CLASSES =,I4/                          ISC26500
     710X,29HNUMBER OF STABILITY CLASSES =,I4/                           ISC26510
     810X,34HNUMBER OF WIND DIRECTION CLASSES =,I4/                      ISC26520
     910X,43HFILE NUMBER OF DATA FILE USED FOR REPORTS =,I4)             ISC26530
 9005 FORMAT (10X,22HTHE PROGRAM IS RUN IN ,3A4)                         ISC26540
 9006 FORMAT (72H *** WARNING - FREQ. OF OCCURRENCE OF SPD VS. DIR IS NO ISC26550
     1T 1.0 FOR SEASON ,I2,19H, PROG. DIVIDES BY ,F9.5,13H TO NORMALIZE) ISC26560
 9007 FORMAT (10X,52HCONCENTRATION (DEPOSITION) UNITS CONVERSION FACTOR  ISC26570
     1=,E14.8/                                                           ISC26580
     210X,41HACCELERATION OF GRAVITY (METERS/SEC**2) =,F7.3/             ISC26590
     310X,46HHEIGHT OF MEASUREMENT OF WIND SPEED (METERS) =,F8.3/        ISC26600
     610X,72HCORRECTION ANGLE FOR GRID SYSTEM VERSUS DIRECTION DATA NORT ISC26610
     7H (DEGREES) =,F8.3/                                                ISC26620
     810X,19HDECAY COEFFICIENT =,E14.8)                                  ISC26630
 9008 FORMAT (10X,25HPROGRAM OPTION SWITCHES =,24(I2,1H,))               ISC26640
 9009 FORMAT (2X,3A4,A3,1X,A1,6A4,2H (,A4,A3,2H)=,6(F11.2,1H,)/(10X,10(F ISC26650
     111.2,1H,)))                                                        ISC26660
 9010 FORMAT (1H0,27X,46H  - AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -/ ISC26670
     1/20X,6(11HSTABILITY  )/20X,6(8HCATEGORY,I2,1X))                    ISC26680
 9011 FORMAT (10X,6HSEASON,I3,6F11.4)                                    ISC26690
 9012 FORMAT (1H0,36X,32H- MIXING LAYER HEIGHT (METERS) -/)              ISC26700
 9013 FORMAT (50X,6HSEASON,I2/21X,6(12H  WIND SPEED)/21X,6(10H  CATEGORY ISC26710
     1,I2))                                                              ISC26720
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9014 FORMAT (1X,18HSTABILITY CATEGORY,I2,6E12.6)                                ISC26730
9015 FORMAT (1H0,20X,66H- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTISC26740
     1ION AND STABILITY -)                                                     ISC26750
9016 FORMAT (1H0,47X,6HSEASON,I2)                                              ISC26760
9017 FORMAT (1H0,41X,18HSTABILITY CATEGORY,I2//20X,6(12H  WIND SPEED)/2ISC26770
     10X,6(10H  CATEGORY,I2)/8X,13HDIRECTION    ,6(1H(,F7.4,4HMPS))/7X,0ISC26780
     29H(DEGREES))                                                             ISC26790
9018 FORMAT (10X,F7.3,3X,6(F12.8))                                             ISC26800
9019 FORMAT (1H0,24X,66H- VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGRISC26810
     1EES KELVIN/METER) -/)                                                    ISC26820
9020 FORMAT (21X,6(12H  WIND SPEED)/21X,6(10H  CATEGORY,I2))                   ISC26830
9021 FORMAT (1X,18HSTABILITY CATEGORY,I2,6E12.6)                               ISC26840
9022 FORMAT (1H0,39X,36H- WIND PROFILE POWER LAW EXPONENTS -/)                  ISC26850
9023 FORMAT (I5,3I1,2F10.0,7F7.0,I1,I2)                                        ISC26860
9024 FORMAT (1H1/////1X,41(1H*),22H END OF ISCLT PROGRAM,,I6,19H SOURCEISC26870
     1S PROCESSED ,40(1H*))                                                    ISC26880
9025 FORMAT (35H WARNING - DISTANCE BETWEEN SOURCE ,I6,15H AND POINT X,ISC26890
     1Y=,F11.2,1H,,F11.2,23H IS LESS THAN PERMITTED)                           ISC26900
9026 FORMAT (/25H **** ERROR - ELEVATION (,F8.2,47H) EXCEEDS SOURCE EMIISC26910
     1SSION ELEVATION FOR SOURCE ,I5,18H, PROG. TERMINATED)                    ISC26920
9027 FORMAT (/81H **** ERROR - DISP CANNOT EQUAL 2 WHEN QFLG IS GREATERISC26930
     1 THAN 0. OFFENDING SOURCE =,I5,18H, PROG. TERMINATED)                    ISC26940
9028 FORMAT (/45H **** ERROR - DISP GREATER THAN 0 FOR SOURCE ,I5,40H, ISC26950
     1NO MORE TAPE SOURCES, PROG. TERMINATED)                                  ISC26960
9029 FORMAT (/45H **** ERROR - DISP GREATER THAN 0 FOR SOURCE ,I5,56H, ISC26970
     1CANNOT FIND CORRESPONDING TAPE SOURCE, PROG TERMINATED)                  ISC26980
9030 FORMAT (32H0WARNING - HB/HB > 5 FOR SOURCE ,I5,69H PROG. USES LATEISC26990
     1RAL VIRTUAL DIST. FOR UPPER BOUND OF CONCENTRATION (DEPOSITION). IISC27000
     2F LOWER/60H BOUND IS DESIRED SET WAKE EFFECTS FLAG (WAKE) = 1 AND ISC27010
     3RERUN)                                                                   ISC27020
9031 FORMAT (10X,40HSOURCES USED TO FORM SOURCE COMBINATION ,I2,6H ARE ISC27030
     1-,10(I6,1H,))                                                           ISC27040
9032 FORMAT (10X,17(I6,1H,))                                                   ISC27050
9033 FORMAT (10X,48HALL SOURCES ARE USED TO FORM SOURCE COMBINATION ,I2ISC27060
     1)                                                                        ISC27070
9034 FORMAT (30H0*** ERROR - AVAILABLE CORE = ,I6,19H, PROBLEM REQUIRESISC27080
     1 ,I6,18H OR MORE LOCATIONS/)                                             ISC27090
9035 FORMAT (71H0*** ERROR - MAX NO. OF SOURCES EXCEEDED FOR NGROUP OR ISC27100
     1ISW(11)=2 OPTION/)                                                       ISC27110
9036 FORMAT (48H *** WARNING - EXIT VELOCITY IS <= 0 FOR SOURCE ,I5,35HISC27120
     1 PROG. SETS TO 1.0E-5 AND CONTINUES)                                     ISC27130
9037 FORMAT (44H *** ERROR - STACK DIAMETER <= 0 FOR SOURCE ,I5)               ISC27140
9038 FORMAT (35H *** ERROR - SIGYO <= 0 FOR SOURCE ,I5)                        ISC27150
9039 FORMAT (35H *** ERROR - SIGZO <= 0 FOR SOURCE ,I5)                        ISC27160
9040 FORMAT (32H *** ERROR - XO <= 0 FOR SOURCE ,I5)                           ISC27170
9041 FORMAT (20H *** ERROR - SOURCE ,I5,32H LESS IN VALUE THAN LAST SOUISC27180
     1RCE ,I5,6H READ.)                                                        ISC27190
9042 FORMAT (34H *** ERROR - DISP CODE FOR SOURCE ,I5,17H IS OUT OF RANISC27200
     1GE.)                                                                     ISC27210
9043 FORMAT (34H *** ERROR - TYPE CODE FOR SOURCE ,I5,17H IS OUT OF RANISC27220
     1GE.)                                                                     ISC27230
9044 FORMAT (34H *** ERROR - QFLG CODE FOR SOURCE ,I5,17H IS OUT OF RANISC27240
     1GE.)                                                                     ISC27250
9045 FORMAT (125H0WARNING - UNABLE TO DETERMINE IF ALL SOURCES WILL FITISC27260
     1 IN CORE (NSOURC<0). IF PROGRAM ABORTS, RERUN USING OUTPUT TAPE ORISC27270
     2 FILE/)                                                                  ISC27280
9501 FORMAT(1X,20A4)                                                           ISC27290
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 9502 FORMAT(1X,8E14.5)                                                          ISC27300
 9599 FORMAT(1X,6F10.8)                                                          ISC27310
      END                                                                        ISC27320
C                                                                               ISC27330
      SUBROUTINE OUTPT(KK,K,X,Y,Z,JSS)                                          ISC27340
C                SUBROUTINE OUTPT (VERSION 86170), PART OF ISCLT.               ISC27350
C     THIS SUBROUTINE PRINTS THE INPUT SOURCE DATA AND ALL CONCENTRATION        ISC27360
C     (DEPOSITION) CALCULATIONS                                                 ISC27370
      COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,NSTBLE,            ISC27380
     1NSCTOR,ISW(24),UNITS(20),TITLE(20),NOFILE                                 ISC27390
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES,         ISC27400
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4       ISC27410
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2       ISC27420
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY                                     ISC27430
      COMMON /SORC/ NUMS,TYPE,DX,DY,H,ZS,TS,VEL,D,HB,BW,BL,NVS,VS(20),          ISC27440
     1FRQ(20),GAMMA(20),Q(6,6,4),QFLG,WAKE                                      ISC27450
      COMMON /HEAD/ MSG3(4),MSG4(8),IS,N3,I3,M3,ILN,LSTILN                      ISC27460
      DIMENSION X(1),Y(1),Z(1),MSG1(6),MSG2(6),IXS(11),IYS(11),ZMX(10)          ISC27470
     1,MSG5(4),MSG6(10),IX10(50),IY10(50)                                       ISC27480
      EQUIVALENCE (SIGYO,TS),(SIGZO,VEL),(BW,X0)                                ISC27490
      INTEGER TITLE,UNITS,TYPE,QFLG,WAKE                                        ISC27500
      DATA IX10,IY10/100*0/                                                     ISC27510
      DATA MSG1/4H STA,2HCK,4HVOLU,2HME,4H ARE,1HA/                             ISC27520
      DATA IBLNK,IX/1H ,1HX/                                                    ISC27530
      DATA IAST/1H*/                                                            ISC27540
      DATA MSG2/4HSTAB,4HILIT,1HY,1H ,4HSPEE,1HD/                               ISC27550
      DATA MSG3/4HSEAS,4HONAL,4H  AN,4HNUAL/                                    ISC27560
      DATA MSG4/4HCONC,4HENTR,4HATIO,1HN,4H DEP,4HOSIT,3HION,1H /               ISC27570
      DATA MSG5/4HPER ,4HSQUA,4HRE M,4HETER/                                    ISC27580
      DATA MSG10/4HDIST,4HANCE,2*1H ,4HRANG,4HE   ,2*1H ,4HAZIM,4HUTH ,         ISC27590
     14HBEAR,3HING/                                                             ISC27600
      IF (KK .EQ. -4) GO TO 880                                                 ISC27610
      IS = JSS                                                                  ISC27620
      IF (KK .NE. 4) GO TO 240                                                  ISC27630
C     PRINT SOURCE DATA                                                         ISC27640
C*************************************************************************     ISC27650
      ILN = 0                                                                   ISC27660
      NUM = 1                                                                   ISC27670
      IF (TYPE .EQ. 2) GO TO 20                                                 ISC27680
      IF (TYPE .EQ. 1) GO TO 10                                                 ISC27690
      NUM = 3                                                                   ISC27700
      GO TO 20                                                                  ISC27710
   10 NUM = 2                                                                   ISC27720
   20 CONTINUE                                                                  ISC27730
      M1 = 0                                                                    ISC27740
      IF (ISW(16) .NE. 0) GO TO 60                                              ISC27750
      IF (ISW(11) .NE. 2.AND.ISW(8) .NE. 2) GO TO 60                            ISC27760
      IF (NVS .EQ. 0) GO TO 30                                                  ISC27770
      ZMX(1) = FLOAT(NVS)/7.0                                                   ISC27780
      M1 = ZMX(1)                                                               ISC27790
      IF (ZMX(1) .GT. FLOAT(M1)) M1 = M1+1                                      ISC27800
      M1 = 3*M1+2                                                               ISC27810
   30 IF (QFLG .GT. 0) GO TO 40                                                 ISC27820
      M1 = M1+3                                                                 ISC27830
      GO TO 60                                                                  ISC27840
   40 IF (QFLG .EQ. 3) GO TO 50                                                 ISC27850
      J = NSTBLE                                                                ISC27860
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      IF (QFLG .EQ. 2) J = NSPEED                                       ISC27870
      M1 = M1+2*J                                                       ISC27880
      GO TO 60                                                          ISC27890
   50 M1 = M1+NSEASN*(3+NSPEED)+1                                       ISC27900
   60 CONTINUE                                                          ISC27910
      DO 70 I=1,10                                                      ISC27920
   70 MSG6(I) = UNITS(10+I)                                             ISC27930
      IF (TYPE .NE. 2) GO TO 90                                         ISC27940
      J = 0                                                             ISC27950
      DO 80 I=1,10                                                      ISC27960
      IF (MSG6(I) .NE. IBLNK) GO TO 80                                  ISC27970
      J = J+1                                                           ISC27980
      IF (J .GT. 4) GO TO 90                                            ISC27990
      MSG6(I) = MSG5(J)                                                 ISC28000
   80 CONTINUE                                                          ISC28010
   90 CONTINUE                                                          ISC28020
      I1 = IBLNK                                                        ISC28030
      I2 = IBLNK                                                        ISC28040
      IF (ICARD .NE. 0) GO TO 100                                       ISC28050
      I2 = IX                                                           ISC28060
      GO TO 110                                                         ISC28070
  100 I1 = IX                                                           ISC28080
  110 NLN = 1                                                           ISC28090
C                                                                       ISC28100
      IF (LSTILN .EQ. ILN) NLN = 0                                      ISC28110
      CALL TITLR(NUM+M1,1,NLN)                                          ISC28120
      LINE = LINE-M1                                                    ISC28130
  120 I3 = 2*TYPE+1                                                     ISC28140
      IF (TYPE .EQ. 1) GO TO 130                                        ISC28150
      IF (TYPE .EQ. 2) GO TO 140                                        ISC28160
C     OUTPUT STACK INFORMATION                                          ISC28170
      WRITE (JUNT,9002) I1,I2,NUMS,MSG1(I3),MSG1(I3+1),DX,DY,H,ZS,TS,VELISC28180
     1,D,HB,BW,WAKE                                                     ISC28190
      GO TO 150                                                         ISC28200
  130 WRITE (JUNT,9003) I1,I2,NUMS,MSG1(I3),MSG1(I3+1),DX,DY,H,ZS,SIGYO,ISC28210
     1SIGZO                                                             ISC28220
      GO TO 150                                                         ISC28230
  140 WRITE (JUNT,9004) I1,I2,NUMS,MSG1(I3),MSG1(I3+1),DX,DY,H,ZS,XO    ISC28240
  150 CONTINUE                                                          ISC28250
C     OUTPUT PARTICULATE INFORMATION IF PRESENT                         ISC28260
      IF (NVS .LE. 0) GO TO 170                                         ISC28270
      CALL TITLR(1,1,0)                                                 ISC28280
      WRITE (JUNT,9018)                                                 ISC28290
      II = -6                                                           ISC28300
  160 II = II+7                                                         ISC28310
      IF (II .GT. NVS) GO TO 170                                        ISC28320
      JJ = II+6                                                         ISC28330
      IF (JJ .GT. NVS) JJ = NVS                                         ISC28340
      CALL TITLR(4,1,0)                                                 ISC28350
      WRITE (JUNT,9019) (I,I=II,JJ)                                     ISC28360
      WRITE (JUNT,9020) (VS(I),I=II,JJ)                                 ISC28370
      WRITE (JUNT,9021) (FRQ(I),I=II,JJ)                                ISC28380
      WRITE (JUNT,9022) (GAMMA(I),I=II,JJ)                              ISC28390
      GO TO 160                                                         ISC28400
  170 CONTINUE                                                          ISC28410
C     OUTPUT SOURCE STRENGTHS                                           ISC28420
      IF (QFLG .EQ. 3) GO TO 210                                        ISC28430
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      IF (QFLG .NE. 0) GO TO 180                                        ISC28440
C     VARIES BY SEASON ONLY                                             ISC28450
      CALL TITLR(3,1,0)                                                 ISC28460
      WRITE (JUNT,9008) MSG6                                            ISC28470
      WRITE (JUNT,9005) (L,L=1,4),(Q(1,1,L),L=1,NSEASN)                 ISC28480
      GO TO 230                                                         ISC28490
  180 J = NSPEED                                                        ISC28500
      IF (QFLG .EQ. 1) J = NSTBLE                                       ISC28510
      I1 = 3*QFLG-2                                                     ISC28520
      CALL TITLR(2,1,0)                                                 ISC28530
      WRITE(JUNT,9008) MSG6                                             ISC28540
      WRITE(JUNT,9006) MSG2(I1),MSG2(I1+1),MSG2(I1+2),(I,I=1,NSEASN)    ISC28550
      DO 200 L = 1,J                                                    ISC28560
      CALL TITLR(1,1,0)                                                 ISC28570
      I2 = 1                                                            ISC28580
      I3 = L                                                            ISC28590
      IF(QFLG .EQ. 1) GO TO 190                                         ISC28600
      I2 = L                                                            ISC28610
      I3 = 1                                                            ISC28620
  190 WRITE(JUNT,9007) L,(Q(I2,I3,I),I=1,NSEASN)                        ISC28630
  200 CONTINUE                                                          ISC28640
      GO TO 230                                                         ISC28650
  210 CALL TITLR(1,1,0)                                                 ISC28660
      WRITE (JUNT,9008) MSG6                                            ISC28670
      DO 220 L=1,NSEASN                                                 ISC28680
      CALL TITLR(3,1,0)                                                 ISC28690
      WRITE (JUNT,9009) L,(I,I=1,NSTBLE)                                ISC28700
      DO 220 J=1,NSPEED                                                 ISC28710
      CALL TITLR(1,1,0)                                                 ISC28720
      WRITE (JUNT,9010) J,(Q(J,I,L),I=1,NSTBLE)                         ISC28730
  220 CONTINUE                                                          ISC28740
  230 CONTINUE                                                          ISC28750
      GO TO 870                                                         ISC28760
C                                                                       ISC28770
C     PRINT CALCULATIONS ON GRID SYSTEM                                 ISC28780
C*********************************************************************ISC28790
  240 N3 = 1                                                            ISC28800
      IF (KK .EQ. 2) N3 = 3                                             ISC28810
      IF (KK .NE. 3.AND.ISW(10) .EQ. 1) GO TO 440                       ISC28820
      M3 = 0                                                            ISC28830
      IF (ISW(1) .EQ. 2) M3 = 4                                         ISC28840
      M1 = 1                                                            ISC28850
      IF (ISW(2) .EQ. 2) M1 = 2                                         ISC28860
      M2 = 1                                                            ISC28870
      IF (ISW(2) .EQ. 2) M2 = 3                                         ISC28880
      M4 = 1                                                            ISC28890
      IF (ISW(2) .EQ. 2) M4 = 2                                         ISC28900
      IF (IS .EQ. 2) GO TO 260                                          ISC28910
      IF (NG. LE. 1.OR.KK .EQ. 3) GO TO 260                             ISC28920
      IF (NOCOMB(NG-1) .EQ. 0) GO TO 250                                ISC28930
      CALL CHECKR(NG-1,I1)                                              ISC28940
      IF (I1 .EQ. 0) GO TO 260                                          ISC28950
  250 CONTINUE                                                          ISC28960
      IF (NOCOMB(NG) .EQ. 1.AND.IDSORC(NGT+1) .GE. 0) GO TO 260         ISC28970
      IF (ISW(11) .EQ. 1) GO TO 870                                     ISC28980
      IF (ISW(12) .EQ. 1) GO TO 870                                     ISC28990
      GO TO 440                                                         ISC29000
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  260 CONTINUE                                                          ISC29010
      IF (NXPNTS .EQ. 0) GO TO 360                                      ISC29020
      ILN = 1                                                           ISC29030
      NN = 2                                                            ISC29040
      IF (ISW(16).EQ.0.OR.KK.EQ.3.OR.LINE+10.GT.NLINES) NN = 1          ISC29050
C                                                                       ISC29060
      LSTILN = ILN                                                      ISC29070
      LX = 1                                                            ISC29080
      I2 = 0                                                            ISC29090
  270 I1 = I2+1                                                         ISC29100
      IF (I1 .GT. NXPNTS) GO TO 360                                     ISC29110
      I2 = I1+6                                                         ISC29120
      IF (I2 .GT. NXPNTS) I2 = NXPNTS                                   ISC29130
      J4 = 1                                                            ISC29140
      J3 = NYPNTS+1                                                     ISC29150
  280 J3 = J3-1                                                         ISC29160
      IF (J3 .EQ. 0) GO TO 270                                          ISC29170
      IF (J4 .NE. 0) GO TO 340                                          ISC29180
      CALL TITLR(1,3,0)                                                 ISC29190
      IF (LINE .GT. 3) GO TO 330                                        ISC29200
  290 WRITE (JUNT,9001)                                                 ISC29210
      LINE = LINE+1                                                     ISC29220
      CALL HEADNG(KK,K)                                                 ISC29230
  300 CONTINUE                                                          ISC29240
      WRITE (JUNT,9011) (MSG10(I,M1),I=1,2),(X(I),I=I1,I2)             ISC29250
      IF (KK .EQ. 3) GO TO 310                                          ISC29260
      WRITE (JUNT,9012) (MSG10(I,M2),I=1,4),(MSG9(I,M4),I=1,2),(MSG4(I+MISC29270
     13),I=1,4)                                                         ISC29280
      GO TO 320                                                         ISC29290
  310 WRITE (JUNT,9013) (MSG10(I,M2),I=1,4),(MSG9(I,M4),I=1,2)          ISC29300
  320 LINE = LINE+6                                                     ISC29310
  330 J4 = (J3-1)*NXPNTS                                                ISC29320
      WRITE (JUNT,9014) Y(J3),(Z(J4+I),I=I1,I2)                         ISC29330
      J4 = 0                                                            ISC29340
      LX = 0                                                            ISC29350
      GO TO 280                                                         ISC29360
  340 IF (LX .EQ. 0) GO TO 350                                          ISC29370
      CALL TITLR(1,3,NN)                                                ISC29380
      GO TO 290                                                         ISC29390
  350 CALL TITLR(8,3,0)                                                 ISC29400
      LINE = LINE-7                                                     ISC29410
      IF (LINE .LE. 3) GO TO 290                                        ISC29420
      WRITE (JUNT,9001)                                                 ISC29430
      WRITE (JUNT,9001)                                                 ISC29440
      LINE = LINE+2                                                     ISC29450
      GO TO 300                                                         ISC29460
C                                                                       ISC29470
C     PRINT CALCULATIONS AT SPECIAL DISCRETE POINTS                     ISC29480
C*****************************************************************    ISC29490
  360 CONTINUE                                                          ISC29500
      IF (KK .NE. 3.AND.ISW(12) .EQ. 1) GO TO 440                       ISC29510
      IF (NXWYPT .LE. 0) GO TO 440                                      ISC29520
      ILN = 2                                                           ISC29530
      J3 = NXXYY                                                        ISC29540
      LX = 1                                                            ISC29550
      NN = 2                                                            ISC29560
      IF (LSTILN .EQ. 1) GO TO 370                                      ISC29570
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      IF (ISW(16) .EQ. 0.OR.KK .EQ. 3) NN = 1                          ISC29580
  370 CONTINUE                                                         ISC29590
      I2 = 0                                                           ISC29600
  380 I1 = I2+1                                                        ISC29610
      IF (I1 .GT. NXWYPT) GO TO 430                                    ISC29620
      I2 = I1+2                                                        ISC29630
      IF (I2 .GT. NXWYPT) I2 = NXWYPT                                  ISC29640
      IF (LX .EQ. 0) GO TO 410                                         ISC29650
      CALL TITLR(9,3,NN)                                               ISC29660
      LINE = LINE-8                                                    ISC29670
  390 CONTINUE                                                         ISC29680
      LINE = LINE-1                                                    ISC29690
  400 CONTINUE                                                         ISC29700
      WRITE (JUNT,9001)                                                ISC29710
      LINE = LINE+2                                                    ISC29720
      CALL HEADNG(KK,K)                                                ISC29730
      LSTILN = 1                                                       ISC29740
      GO TO 420                                                        ISC29750
  410 CONTINUE                                                         ISC29760
      CALL TITLR(1,3,0)                                                ISC29770
      IF (LINE .LE. 3) GO TO 390                                       ISC29780
  420 WRITE (JUNT,9015) (X(NXPNTS+J),Y(NYPNTS+J),Z(J3+J),J=I1,I2)      ISC29790
      LX = 0                                                           ISC29800
      GO TO 380                                                        ISC29810
  430 LSTILN = 2                                                       ISC29820
  440 CONTINUE                                                         ISC29830
      IF (ISW(10) .EQ. 0.OR.KK.EQ. 3) GO TO 870                        ISC29840
C                                                                      ISC29850
C     FIND MAX TEN VALUES OF CONCENTRATION (DEPOSITION)                ISC29860
C**********************************************************************ISC29870
      IF (ISW(11) .NE. 2) GO TO 470                                    ISC29880
C     DETERMINE AND SAVE INDICES OF THE MAX 10 POINTS FOR THE COMBINED ISC29890
C     SOURCES FOR SEASON 1, 2, --- , ANNUAL                            ISC29900
      IF (IS .EQ. 1) GO TO 870                                         ISC29910
      L = (K-1)*10                                                     ISC29920
      IF (KK .EQ. 2) L = NSEASN*10                                     ISC29930
  450 CALL MXIMUM(IXS,IYS,ZMX,Z)                                       ISC29940
      DO 460 I=1,10                                                    ISC29950
      IX10(L+I) = IXS(I)                                               ISC29960
  460 IY10(L+I) = IYS(I)                                               ISC29970
      GO TO 870                                                        ISC29980
  470 CONTINUE                                                         ISC29990
      L6 = 0                                                           ISC30000
      L = 0                                                            ISC30010
      L4 = 0                                                           ISC30020
      IF (NXWYPT .EQ. 0) GO TO 490                                     ISC30030
      IF (NXPNTS .EQ. 0) GO TO 500                                     ISC30040
C     HAVE BOTH TYPES OF RECEPTORS                                     ISC30050
      IF (ISW(2) .EQ. ISW(3)) GO TO 490                                ISC30060
      IF (NXXYY .GT. NXWYPT) GO TO 480                                 ISC30070
C     USE ISW(3) AS PRIMARY UNITS DISPLAY                              ISC30080
      L = ISW(3)                                                       ISC30090
      L4 = 2                                                           ISC30100
      GO TO 510                                                        ISC30110
C     USE ISW(2) AS PRIMARY UNITS DISPLAY                              ISC30120
  480 L = ISW(2)                                                       ISC30130
      L4 = 1                                                           ISC30140
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      GO TO 510                                                         ISC30150
  490 L = ISW(2)                                                        ISC30160
      L4 = 0                                                            ISC30170
      GO TO 510                                                         ISC30180
  500 L = ISW(3)                                                        ISC30190
      L4 = 0                                                            ISC30200
  510 CONTINUE                                                          ISC30210
      M1 = 1                                                            ISC30220
      M2 = 3                                                            ISC30230
      M4 = 4                                                            ISC30240
      M5 = 2                                                            ISC30250
      M6 = 3                                                            ISC30260
      M7 = 4                                                            ISC30270
      M8 = 2                                                            ISC30280
      IF (L .LT. 2) GO TO 520                                           ISC30290
      M1 = 2                                                            ISC30300
      M2 = 1                                                            ISC30310
      M4 = 2                                                            ISC30320
      M5 = 3                                                            ISC30330
      M6 = 1                                                            ISC30340
      M7 = 2                                                            ISC30350
      M8 = 3                                                            ISC30360
  520 CONTINUE                                                          ISC30370
      IF (ISW(11) .NE. 1) GO TO 540                                     ISC30380
      CALL MXIMUM(IXS,IYS,ZMX,Z)                                        ISC30390
      L2 = 0                                                            ISC30400
      DO 530 I=1,10                                                     ISC30410
      IF (IXS(I) .EQ. 0.OR.IYS(I) .EQ. 0) GO TO 530                     ISC30420
      IF (ZMX(I) .GT. 0.0) L2 = I                                       ISC30430
  530 CONTINUE                                                          ISC30440
      GO TO 620                                                         ISC30450
  540 IF (ISW(12) .EQ. -1) GO TO 570                                    ISC30460
      IF (ISW(12) .NE. 1) GO TO 870                                     ISC30470
C     MAXIMUM POINTS HAVE BEEN INPUT BY THE USER                        ISC30480
      L = 0                                                             ISC30490
      IF (NSEASN .EQ. 1.OR.NXWYPT .LE. 10) GO TO 550                    ISC30500
      L = (K-1)*10                                                      ISC30510
      IF (KK .EQ. 2) L = NSEASN*10                                      ISC30520
  550 L2 = 0                                                            ISC30530
      DO 560 I=1,10                                                     ISC30540
      IXS(I) = NXPNTS+I+L                                               ISC30550
      IYS(I) = NYPNTS+I+L                                               ISC30560
      ZMX(I) = Z(NXXYY+I+L)                                             ISC30570
      IF (IXS(I) .EQ. 0.OR.IYS(I) .EQ. 0) GO TO 560                     ISC30580
      IF (ZMX(I) .GT. 0.0) L2 = I                                       ISC30590
  560 CONTINUE                                                          ISC30600
      GO TO 620                                                         ISC30610
  570 CONTINUE                                                          ISC30620
      L = (K-1)*10                                                      ISC30630
      IF (KK .EQ. 2) L = NSEASN*10                                      ISC30640
  580 L2 = 0                                                            ISC30650
      DO 610 I=1,10                                                     ISC30660
      IXS(I) = IX10(I+L)                                                ISC30670
      IYS(I) = IY10(I+L)                                                ISC30680
      IF (IXS(I) .GT. NXPNTS) GO TO 590                                 ISC30690
      JJ = (IYS(I)-1)*NXPNTS+IXS(I)                                     ISC30700
      GO TO 600                                                         ISC30710
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  590 JJ = NXXYY+IXS(I)-NXPNTS                                          ISC30720
  600 ZMX(I) = Z(JJ)                                                    ISC30730
      IF (IXS(I) .EQ. 0.OR.IYS(I) .EQ. 0) GO TO 610                     ISC30740
      IF (ZMX(I) .GT. 0.0) L2 = I                                       ISC30750
  610 CONTINUE                                                          ISC30760
  620 CONTINUE                                                          ISC30770
      I = 1                                                             ISC30780
      IF (ISW(12).EQ.0.OR.IS.EQ.2.OR.NOCOMB(NG).EQ.0) GO TO 640         ISC30790
      J = 2                                                             ISC30800
  630 I = I+1                                                           ISC30810
      J = J+1                                                           ISC30820
      IF (J .GT. NOCOMB(NG)) GO TO 640                                  ISC30830
      J = J+12                                                          ISC30840
      GO TO 630                                                         ISC30850
  640 L1 = I-1                                                          ISC30860
      NN = 2                                                            ISC30870
      IF (LSTILN .EQ. 1.OR.LSTILN .EQ. 2) GO TO 660                     ISC30880
      IF (ISW(16) .EQ. 0) NN = 1                                        ISC30890
  660 CONTINUE                                                          ISC30900
      ILN = 3                                                           ISC30910
      L2 = L2+1                                                         ISC30920
      IF (L2 .LE. 1) GO TO 860                                          ISC30930
      L5 = IBLNK                                                        ISC30940
      L3 = 0                                                            ISC30950
      DO 850 J=1,L2                                                     ISC30960
      IF (J .EQ. L2) GO TO 680                                          ISC30970
      I1 = IXS(J)                                                       ISC30980
      I2 = IYS(J)                                                       ISC30990
      IF (I1 .EQ. 0.OR.I2 .EQ. 0) GO TO 850                             ISC31000
      IF (L3 .NE. 0) GO TO 680                                          ISC31010
      L3 = 1                                                            ISC31020
      L = 11                                                            ISC31030
      IF (LSTILN .EQ. 3.AND.NN .EQ. 2) L = L+L2/2                       ISC31040
      L = L+L1                                                          ISC31050
      CALL TITLR(L,3,NN)                                                ISC31060
      LINE = LINE-L                                                     ISC31070
      IF (LINE .GT. 2.AND.LSTILN .EQ. 3) GO TO 670                      ISC31080
      IF (LINE .GT. 2.AND.LSTILN .NE. 0) GO TO 690                      ISC31090
  670 WRITE (6,9030)                                                    ISC31100
      LINE = LINE+1                                                     ISC31110
      CALL HEADNG(KK,K)                                                 ISC31120
      GO TO 690                                                         ISC31130
  680 CALL TITLR(1,3,0)                                                 ISC31140
      IF (LINE .LE. 3) GO TO 670                                        ISC31150
      GO TO 800                                                         ISC31160
  690 IF (ISW(12) .NE. 0) GO TO 710                                     ISC31170
  700 WRITE (JUNT,9023)                                                 ISC31180
      LINE = LINE+3                                                     ISC31190
      GO TO 790                                                         ISC31200
  710 IF (ISW(12) .GT. 0) GO TO 740                                     ISC31210
      IF (IS .EQ. 2) GO TO 700                                          ISC31220
C     INDIVIDUAL SOURCE CONTRIBUTION TO COMBINED MAXIMUM 10             ISC31230
      IF (NOCOMB(NG) .EQ. 0) GO TO 730                                  ISC31240
      J1 = 1                                                            ISC31250
      J2 = 2                                                            ISC31260
      IF (J2 .GT. NOCOMB(NG)) J2 = NOCOMB(NG)                           ISC31270
      WRITE (JUNT,9024) (IDSORC(NGT+I),I=J1,J2)                         ISC31280
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      LINE = LINE+2                                                     ISC31290
  720 J1 = J2                                                           ISC31300
      J1 = J1+1                                                         ISC31310
      IF (J1 .GT. NOCOMB(NG)) GO TO 780                                 ISC31320
      J2 = J1+11                                                        ISC31330
      IF (J2 .GT. NOCOMB(NG)) J2 = NOCOMB(NG)                           ISC31340
      LINE = LINE+1                                                     ISC31350
      WRITE (JUNT,9025) (IDSORC(NGT+I),I=J1,J2)                         ISC31360
      LINE = LINE+1                                                     ISC31370
      GO TO 720                                                         ISC31380
  730 WRITE (JUNT,9026)                                                 ISC31390
      LINE = LINE+3                                                     ISC31400
      GO TO 790                                                         ISC31410
  740 IF (NG .EQ. 1) GO TO 760                                          ISC31420
  750 WRITE (JUNT,9027)                                                 ISC31430
      LINE = LINE+3                                                     ISC31440
      GO TO 790                                                         ISC31450
  760 IF (ISW(8) .EQ. 1) GO TO 750                                      ISC31460
      IF (NOCOMB(NG) .EQ. 0) GO TO 770                                  ISC31470
      J1 = 1                                                            ISC31480
      J2 = 2                                                            ISC31490
      IF (J2 .GT. NOCOMB(NG)) J2 = NOCOMB(NG)                           ISC31500
      WRITE (JUNT,9028) (IDSORC(NGT+I),I=J1,J2)                         ISC31510
      LINE = LINE+2                                                     ISC31520
      GO TO 720                                                         ISC31530
  770 WRITE (JUNT,9029)                                                 ISC31540
      LINE = LINE+3                                                     ISC31550
      GO TO 790                                                         ISC31560
  780 WRITE (JUNT,9030)                                                 ISC31570
      LINE = LINE+1                                                     ISC31580
  790 CONTINUE                                                          ISC31590
      LINE = LINE+6                                                     ISC31600
      WRITE (JUNT,9016) (MSG4(M3+I),I=1,4),(MSG10(I,2),I=M2,M4),(MSG10(ISC31610
     1,M5),I=M6,M7),(MSG10(I,M8),I=3,4),(MSG9(I,1),I=1,2),(MSG9(I,M1),I=ISC31620
     21,2)                                                              ISC31630
  800 IF (J .EQ. L2) GO TO 830                                          ISC31640
      L5 = IBLNK                                                        ISC31650
      IF (L4 .EQ. 0) GO TO 820                                          ISC31660
      IF (L4 .EQ. 2) GO TO 810                                          ISC31670
C     LABEL FROM GRID SYSTEM USED, DETERMINE IF THIS RECEPTOR IS AN     ISC31680
C     ARBITRARILY SPACED RECEPTOR WITH DIFFERENT UNITS                  ISC31690
      IF (I1 .GT. NXPNTS) L5 = IAST                                     ISC31700
      GO TO 820                                                         ISC31710
C     LABEL FROM ARBITRARILY SPACED POINTS USED, DETERMINE IF THIS      ISC31720
C     RECEPTOR IS FROM GRID SYSTEM WITH DIFFERENT UNITS                 ISC31730
  810 IF (I1 .LE. NXPNTS) L5 = IAST                                     ISC31740
  820 CONTINUE                                                          ISC31750
      WRITE (JUNT,9017) L5,X(I1),Y(I2),ZMX(J)                           ISC31760
      IF (L5 .NE. IBLNK) L6 = 1                                         ISC31770
      GO TO 850                                                         ISC31780
  830 IF (L4 .EQ. 0) GO TO 850                                          ISC31790
      IF (L6 .EQ. 0) GO TO 850                                          ISC31800
      IF (L4 .EQ. 2) GO TO 840                                          ISC31810
      L6 = 1                                                            ISC31820
      IF (ISW(3) .GE. 2) L6 = 2                                         ISC31830
      WRITE (JUNT,9031) (MSG9(L4,L6),L4=1,2)                            ISC31840
      GO TO 850                                                         ISC31850
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  840 L6 = 1                                                              ISC31860
      IF (ISW(2) .GE. 2) L6 = 2                                           ISC31870
      WRITE (JUNT,9031) (MSG9(L4,L6),L4=1,2)                              ISC31880
  850 CONTINUE                                                            ISC31890
  860 CONTINUE                                                            ISC31900
      IF (ISW(16) .EQ. 0) LINE = NLINES                                   ISC31910
  870 CONTINUE                                                            ISC31920
      GO TO 920                                                           ISC31930
  880 CONTINUE                                                            ISC31940
      LINE = NLINES                                                       ISC31950
      ILN = 4                                                             ISC31960
      I1 = -10                                                            ISC31970
  890 I1 = I1+11                                                          ISC31980
      IF (I1 .GT. K) GO TO 910                                            ISC31990
      I2 = I1+10                                                          ISC32000
      IF (I2 .GT. K) I2 = K                                               ISC32010
      I = 0                                                               ISC32020
      DO 900 J=I1,I2                                                      ISC32030
      I = I+1                                                             ISC32040
      IXS(I) = ITSAVE(J)/10                                               ISC32050
  900 IYS(I) = ITSAVE(J)-IXS(I)*10                                        ISC32060
      CALL TITLR(1,4,0)                                                   ISC32070
      WRITE (JUNT,9001) (IXS(J),IYS(J),J=1,I)                             ISC32080
      GO TO 890                                                           ISC32090
  910 K = 0                                                               ISC32100
      LINE = NLINES                                                       ISC32110
  920 CONTINUE                                                            ISC32120
      LSTILN = ILN                                                        ISC32130
      RETURN                                                              ISC32140
 9001 FORMAT (11(1X,I6,3X,I1,1X))                                         ISC32150
 9002 FORMAT (1X,A1,1X,A1,I7,1X,A4,A2,2F12.2,F7.2,F8.2,23H GAS EXIT TEMPISC32160
     1 (DEG K)=,F7.2,24H, GAS EXIT VEL. (M/SEC)=,F6.2,1H,/58X,19HSTACK DISC32170
     2IAMETER (M)=,F6.3,28H, HEIGHT OF ASSO. BLDG. (M)=,F6.2,10H, WIDTH ISC32180
     3OF/58X,16HASSO. BLDG. (M)=,F7.2,21H, WAKE EFFECTS FLAG =,I2)       ISC32190
 9003 FORMAT (1X,A1,1X,A1,I7,1X,A4,A2,2F12.2,F7.2,F8.2,61H STANDARD DEVIISC32200
     1ATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=,F7.2/58X,59HSTANDAISC32210
     2RD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=,F7.2)        ISC32220
 9004 FORMAT (1X,A1,1X,A1,I7,1X,A4,A2,2F12.2,F7.2,F8.2,19H WIDTH OF AREAISC32230
     1 (M)=,F8.2)                                                        ISC32240
 9005 FORMAT (65X,4(5X,6HSEASON,I2)/67X,4(1PE13.5))                       ISC32250
 9006 FORMAT (58X,2A4,A1,9H CATEGORY,4(3X,6HSEASON,I2,2X))                ISC32260
 9007 FORMAT (67X,I2,7X,4(1PE13.5))                                       ISC32270
 9008 FORMAT (64X,20H- SOURCE STRENGTHS (,10A4,3H) -)                     ISC32280
 9009 FORMAT (92X,8H- SEASON,I2,2H -/39X,14HSPEED CATEGORY,31X,24H- STABISC32290
     1ILITY CATEGORIES -/49X,6(10X,1H(,I1,1H)))                          ISC32300
 9010 FORMAT (46X,I2,5X,6(1PE13.5))                                       ISC32310
 9011 FORMAT (53X,25H- GRID SYSTEM RECEPTORS -/51X,10H- X AXIS (,2A4,11HISC32320
     1, METERS) -/14X,9F13.3)                                            ISC32330
 9012 FORMAT (1X,8HY AXIS (,3A4,A3,2H, ,2A4,1H),25X,3H-  ,3A4,A1,3H  -/1ISC32340
     14X,29(4H----)/)                                                    ISC32350
 9013 FORMAT (1X,8HY AXIS (,3A4,A3,2H, ,2A4,1H),24X,14H- ELEVATIONS -/14ISC32360
     1X,29(4H----)/)                                                     ISC32370
 9014 FORMAT (1X,F13.3,1X,9F13.6)                                         ISC32380
 9015 FORMAT (3(1X,F9.1,F11.1,F14.6,5X))                                  ISC32390
 9016 FORMAT (51X,1HX,12X,1HY,8X,4A4/47X,23HCOORDINATE   COORDINATE/49X,ISC32400
     1A4,A1,8X,A4,A3/62X,A4,A3/48X,1H(,A4,A2 1H),5X,1H(,A4,A3,1H)/47X,39ISC32410
     2(1H-))                                                             ISC32420
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 9017 FORMAT (44X,A1,1X,F11.2,2X,F11.2,2X,F14.6)                          ISC32430
 9018 FORMAT (82X,26H- PARTICULATE CATEGORIES -)                          ISC32440
 9019 FORMAT (78X,7(5X,I2))                                              ISC32450
 9020 FORMAT (58X,22HFALL VELOCITY (MPS)   ,7F7.4)                       ISC32460
 9021 FORMAT (58X,13HMASS FRACTION,9X,7F7.4)                             ISC32470
 9022 FORMAT (58X,22HREFLECTION COEFFICIENT,7F7.4)                       ISC32480
 9023 FORMAT (1H0,45X,40H- PROGRAM DETERMINED MAXIMUM 10 VALUES -/)      ISC32490
 9024 FORMAT (1H0,19X,78H- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED  ISC32500
     1MAXIMUM 10 OF COMBINED SOURCES ,2(I6,1H,))                         ISC32510
 9025 FORMAT (20X,2H- ,12(I6,1H,))                                       ISC32520
 9026 FORMAT (1H0,23X,83H- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED  ISC32530
     1MAXIMUM 10 OF ALL SOURCES COMBINED -/)                             ISC32540
 9027 FORMAT (1H0,45X,39H- USER SPECIFIED 10 SPECIAL RECEPTORS -/)       ISC32550
 9028 FORMAT (1H0,16X,84H- 10 CONTRIBUTING VALUES TO USER SPECIFIED 10 SISC32560
     1PECIAL RECEPTORS OF COMBINED SOURCES ,2(I6,1H,))                   ISC32570
 9029 FORMAT (1H0,20X,89H- 10 CONTRIBUTING VALUES TO USER SPECIFIED 10 SISC32580
     1PECIAL RECEPTORS OF ALL SOURCES COMBINED -/)                       ISC32590
 9030 FORMAT (1H )                                                       ISC32600
 9031 FORMAT (23X,47H* - MEANS RECEPTORS ARE IN UNITS OF METERS AND ,A4, ISC32610
     1A3,32H, NOT UNITS GIVEN IN THE HEADING)                            ISC32620
      END                                                                ISC32630
C                                                                        ISC32640
      SUBROUTINE HEADNG(KK,K)                                            ISC32650
C                SUBROUTINE HEADNG (VERSION 86170), PART OF ISCLT.       ISC32660
C     PRINT HEADINGS ON CONCENTRATION (DEPOSITION) TABLES                ISC32670
      COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,NSTBLE,     ISC32680
     1NSCTOR,ISW(24),UNITS(20),TITLE(20),NOFILE                          ISC32690
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES,  ISC32700
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC32710
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC32720
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY                              ISC32730
      COMMON /SORC/ NUMS,TYPE,DX,DY,H,ZS,TS,VOL,D,HB,BW,BL,NVS,VS(20),   ISC32740
     1FRQ(20),GAMMA(20),Q(6,6,4),QFLG                                    ISC32750
      COMMON /HEAD/ MSG3(4),MSG4(8),IS,N3,I3,M3,ILN,LSTILN               ISC32760
      DATA IBLNK/1H /                                                    ISC32770
      IC = ICONT(1,NT4)                                                  ISC32780
      IF (NT4 .EQ. 1) IC = IBLNK                                         ISC32790
      IF (KK .NE. 3) GO TO 30                                            ISC32800
      IF (ILN .NE. 1) GO TO 10                                           ISC32810
      WRITE (JUNT,9001) (ICONT(I,NT4),I=1,3)                             ISC32820
      LINE = LINE+2                                                      ISC32830
      GO TO 200                                                          ISC32840
   10 IF (ILN .NE. 2) GO TO 200                                          ISC32850
C                                                                        ISC32860
      M1 = 1                                                             ISC32870
      M2 = 1                                                             ISC32880
      IF (ISW(3) .LE. 1) GO TO 20                                        ISC32890
      M1 = 2                                                             ISC32900
      M2 = 3                                                             ISC32910
   20 WRITE (JUNT,9007) (ICONT(I,NT4),I=1,3)                             ISC32920
      LINE = LINE+3                                                      ISC32930
      WRITE (JUNT,9008) ((MSG10(I,M1),I=1,2),(MSG10(I,M2),I=1,2),J=1,3),ISC32940
     1((MSG10(I,M2),I=3,4),J=1,3),((MSG9(I,M1),I=1,2),J=1,3)             ISC32950
      LINE = LINE+5                                                      ISC32960
      GO TO 200                                                          ISC32970
   30 IF (ILN .NE. 2) GO TO 40                                           ISC32980
      IF (LINE .GT. 4.AND.LSTILN .EQ. 1) GO TO 180                       ISC32990
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 40 IF (ISW(1) .EQ. 2) GO TO 100                                          ISC33000
    IF (IS .EQ. 2) GO TO 60                                               ISC33010
    J2 = NUMS                                                             ISC33020
 50 WRITE (JUNT,9002) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),J2            ISC33030
   1,IC,ICONT(2,NT4)                                                      ISC33040
    LINE = LINE+1                                                         ISC33050
    GO TO 160                                                             ISC33060
 60 IF (NOCOMB(NG) .GT. 0) GO TO 70                                       ISC33070
    WRITE (JUNT,9003) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),IC,           ISC33080
   1ICONT(2,NT4)                                                          ISC33090
    LINE = LINE+1                                                         ISC33100
    GO TO 160                                                             ISC33110
 70 J1 = 2                                                                ISC33120
    IF (J1 .GT. NOCOMB(NG)) J1 = NOCOMB(NG)                               ISC33130
    IF (J1 .GT. 1) GO TO 80                                               ISC33140
    IF (IDSORC(J1+NGT) .LT. 0) GO TO 80                                   ISC33150
    J2 = IDSORC(J1+NGT)                                                   ISC33160
    GO TO 50                                                              ISC33170
 80 WRITE (JUNT,9010) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),IC,ICONT(2ISC33180
   1,NT4),(IDSORC(I+NGT),I=1,J1)                                          ISC33190
    LINE = LINE+1                                                         ISC33200
 90 J1 = J1+1                                                             ISC33210
    IF (J1 .GT. NOCOMB(NG)) GO TO 160                                     ISC33220
    J2 = J1+16                                                            ISC33230
    IF (J2 .GT. NOCOMB(NG)) J2 = NOCOMB(NG)                               ISC33240
    WRITE (JUNT,9011) (IDSORC(I+NGT),I=J1,J2)                             ISC33250
    LINE = LINE+1                                                         ISC33260
    J1 = J2                                                               ISC33270
    GO TO 90                                                              ISC33280
100 IF (IS .EQ. 2) GO TO 120                                              ISC33290
    J2 = NUMS                                                             ISC33300
110 WRITE (JUNT,9004) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),J2            ISC33310
   1,IC,ICONT(2,NT4)                                                      ISC33320
    LINE = LINE+1                                                         ISC33330
    GO TO 160                                                             ISC33340
120 IF (NOCOMB(NG) .GT. 0) GO TO 130                                      ISC33350
    WRITE (JUNT,9005) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),IC,           ISC33360
   1ICONT(2,NT4)                                                          ISC33370
    LINE = LINE+1                                                         ISC33380
    GO TO 160                                                             ISC33390
130 J1 = 2                                                                ISC33400
    IF (J1 .GT. NOCOMB(NG)) J1 = NOCOMB(NG)                               ISC33410
    IF (J1 .GT. 1) GO TO 140                                              ISC33420
    IF (IDSORC(J1+NGT) .LT. 0) GO TO 140                                  ISC33430
    J2 = IDSORC(J1+NGT)                                                   ISC33440
    GO TO 110                                                             ISC33450
140 WRITE (JUNT,9012) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),IC,ICONT(2ISC33460
   1,NT4),(IDSORC(I+NGT),I=1,J1)                                          ISC33470
    LINE = LINE+1                                                         ISC33480
150 J1 = J1+1                                                             ISC33490
    IF (J1 .GT. NOCOMB(NG)) GO TO 160                                     ISC33500
    J2 = J1+16                                                            ISC33510
    IF (J2 .GT. NOCOMB(NG)) J2 = NOCOMB(NG)                               ISC33520
    WRITE (JUNT,9011) (IDSORC(I+NGT),I=J1,J2)                             ISC33530
    LINE = LINE+1                                                         ISC33540
    J1 = J2                                                               ISC33550
    GO TO 150                                                             ISC33560
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  160 IF (KK .NE. 1) GO TO 170                                                  ISC33570
      WRITE (JUNT,9006) K                                                       ISC33580
      LINE = LINE+1                                                             ISC33590
  170 CONTINUE                                                                  ISC33600
      IF (ILN .NE. 2) GO TO 200                                                 ISC33610
  180 CONTINUE                                                                  ISC33620
      M1 = 1                                                                    ISC33630
      M2 = 1                                                                    ISC33640
      IF (ISW(3) .LE. 1) GO TO 190                                              ISC33650
      M1 = 2                                                                    ISC33660
      M2 = 3                                                                    ISC33670
  190 WRITE (JUNT,9009) ((MSG4(J+M3),J=1,4),I=1,3)                              ISC33680
      WRITE (JUNT,9008) ((MSG10(I,M1),I=1,2),(MSG10(I,M2),I=1,2),J=1,3),ISC33690
     1((MSG10(I,M2),I=3,4),J=1,3),((MSG9(I,M1),I=1,2),J=1,3)                    ISC33700
      LINE = LINE+8                                                             ISC33710
  200 CONTINUE                                                                  ISC33720
      NT4 = 2                                                                   ISC33730
      RETURN                                                                    ISC33740
 9001 FORMAT (34X,51H- GRID SYSTEM RECEPTOR TERRAIN ELEVATIONS (METERS) ISC33750
     1,3A4/)                                                                    ISC33760
 9002 FORMAT (9X,3H** ,2A4,29H GROUND LEVEL CONCENTRATION (,10A4,16H) DUISC33770
     1E TO SOURCE ,I6,1X,2A4,3H **)                                             ISC33780
 9003 FORMAT (6X,3H** ,2A4,29H GROUND LEVEL CONCENTRATION (,10A4,20H) FRISC33790
     1OM ALL SOURCES COMBINED ,2A4,3H **)                                       ISC33800
 9004 FORMAT (9X,3H** ,2A4,26H GROUND LEVEL DEPOSITION (,10A4,16H) DUE TISC33810
     1O SOURCE ,I6,1X,2A4,3H **)                                                ISC33820
 9005 FORMAT (8X,3H** ,2A4,26H GROUND LEVEL DEPOSITION (,10A4,20H) FROM ISC33830
     1ALL SOURCES COMBINED ,2A4,3H **)                                          ISC33840
 9006 FORMAT (60X,7HSEASON ,I2)                                                 ISC33850
 9007 FORMAT (42X,48H- DISCRETE RECEPTOR TERRAIN ELEVATIONS (METERS) ,3AISC33860
     14//1X,3(4X,1HX,9X,1HY,7X,9HELEVATION,9X))                                 ISC33870
 9008 FORMAT (1X,3(1X,2A4,1X,2A4,22X)/1X,3(10X,2A4,22X)/1X,3(11H (METERSISC33880
     1) (,A4,A3,1H),21X)/14X,58(2H--)/)                                         ISC33890
 9009 FORMAT (1H0,54X,22H- DISCRETE RECEPTORS -/1X,3(4X,1HX,9X,1HY,6X,3AISC33900
     14,A1,6X))                                                                 ISC33910
 9010 FORMAT (3X,3H** ,2A4,29H GROUND LEVEL CONCENTRATION (,10A4,2H) ,2AISC33920
     14,22HFROM COMBINED SOURCES ,2(I6,1H,))                                    ISC33930
 9011 FORMAT (3X,3H** ,17(I6,1H,))                                              ISC33940
 9012 FORMAT (3X,3H** ,2A4,26H GROUND LEVEL DEPOSITION (,10A4,2H) ,2A4,2ISC33950
     12HFROM COMBINED SOURCES ,2(I6,1H,))                                       ISC33960
      END                                                                       ISC33970
C                                                                               ISC33980
      SUBROUTINE TITLR(N,L,LL)                                                  ISC33990
C                 SUBROUTINE TITLR (VERSION 86170), PART OF ISCLT.            ISC34000
      COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,NSTBLE,            ISC34010
     1NSCTOR,ISW(24),UNITS(20),TITLE(20),NOFILE                                 ISC34020
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES,         ISC34030
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC34040
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC34050
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY                                     ISC34060
      DATA IPAGE/0/                                                             ISC34070
      IF (LL .EQ. 1) GO TO 10                                                   ISC34080
      LINE = LINE+N                                                             ISC34090
      IF (LINE .LT. NLINES) GO TO 70                                            ISC34100
   10 IPAGE = IPAGE+1                                                           ISC34110
      WRITE (JUNT,9001) TITLE,IPAGE                                             ISC34120
      LINE = 2                                                                  ISC34130
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   20 GO TO (30,40,50,60),L                                                ISC34140
   30 WRITE (JUNT,9002) (ICONT(I,NT2),I=1,3)                               ISC34150
      IF (ISW(8) .EQ. 2) NT2 = 2                                           ISC34160
      LINE = LINE+8+N                                                      ISC34170
      GO TO 80                                                             ISC34180
   40 WRITE (JUNT,9003) (ICONT(I,NT1),I=1,3)                               ISC34190
      NT1 = 2                                                              ISC34200
      LINE = LINE+2+N                                                      ISC34210
      GO TO 80                                                             ISC34220
   50 LINE = LINE+N                                                        ISC34230
      GO TO 80                                                             ISC34240
   60 WRITE (JUNT,9004) (ICONT(I,NT3),I=1,3)                               ISC34250
      NT3 = 2                                                              ISC34260
      LINE = LINE+3+N                                                      ISC34270
      GO TO 80                                                             ISC34280
   70 IF (LL .NE. 2) GO TO 80                                              ISC34290
      LINE = LINE-N                                                        ISC34300
      GO TO 20                                                             ISC34310
   80 CONTINUE                                                             ISC34320
      RETURN                                                               ISC34330
 9001 FORMAT (1H1,11H**** ISCLT ,13(1H*),1X,20A4,1X, 8(1H*),6H PAGE ,I6,ISC34340
     15H ****/)                                                            ISC34350
 9002 FORMAT (/50X,20H- SOURCE INPUT DATA ,3A4//23H C T SOURCE SOURCE   ISC34360
     1  ,1HX,11X,1HY,6X,16HEMISSION  BASE //58H A A NUMBER  TYPE  COORDIISC34370
     2NATE  COORDINATE  HEIGHT  ELEV- /,18X,36H- SOURCE DETAILS DEPENDINISC34380
     3G ON TYPE -/4H R P,18X,3H(M),9X,3H(M),8X,3H(M),3X,7HATION //4H D EISC34390
     4,48X,6H(M)  //1X,64(2H--))                                          ISC34400
 9003 FORMAT (40X,19H- ISCLT INPUT DATA ,3A4/)                            ISC34410
 9004 FORMAT (40X,36H- SUMMARY OF SOURCES OUTPUT TO TAPE ,3A4//11(12H NUISC34420
     1MBER/TYPE))                                                         ISC34430
      END                                                                  ISC34440
C                                                                         ISC34450
      SUBROUTINE SUMMER(AR1,AR2,L1)                                       ISC34460
C                SUBROUTINE SUMMER (VERSION 86170), PART OF ISCLT.        ISC34470
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES,   ISC34480
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC34490
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC34500
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY                               ISC34510
      DIMENSION AR1(1),AR2(1)                                             ISC34520
      IF (L1 .LT. 0) GO TO 40                                             ISC34530
      IF (L1 .EQ. 1) GO TO 20                                             ISC34540
      DO 10 I=1,NXXYYP                                                    ISC34550
   10 AR1(I) = AR1(I)+AR2(I)                                              ISC34560
      GO TO 60                                                            ISC34570
   20 DO 30 I=1,NXXYYP                                                    ISC34580
   30 AR1(I) = AR2(I)                                                     ISC34590
      GO TO 60                                                            ISC34600
   40 DO 50 I=1,NXXYYP                                                    ISC34610
   50 AR1(I) = AR1(I)*XSEA                                                ISC34620
   60 RETURN                                                              ISC34630
      END                                                                 ISC34640
C                                                                         ISC34650
      SUBROUTINE MXIMUM(IXS,IYS,ZMX,Z)                                    ISC34660
C                SUBROUTINE MXIMUM (VERSION 86170), PART OF ISCLT.        ISC34670
      COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,NSTBLE,      ISC34680
     1NSCTOR,ISW(24),UNITS(20),TITLE(20),NOFILE                           ISC34690
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES,   ISC34700
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     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC34710
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC34720
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY                            ISC34730
      DIMENSION IXS(1),IYS(1),ZMX(1),Z(1)                              ISC34740
      DO 10 I=1,10                                                     ISC34750
      IXS(I) = 0                                                       ISC34760
      IYS(I) = 0                                                       ISC34770
   10 ZMX(I) = 0.0                                                     ISC34780
      N = 10                                                           ISC34790
      J4 = 1                                                           ISC34800
      JJ = 0                                                           ISC34810
   20 JJ = JJ+1                                                        ISC34820
      IF (JJ .GT. NYPNTS) GO TO 40                                     ISC34830
      JJJ = (JJ-1)*NXPNTS                                              ISC34840
      II = 0                                                           ISC34850
   30 II = II+1                                                        ISC34860
      IF (II .GT. NXPNTS) GO TO 20                                     ISC34870
      IJ = JJJ+II                                                      ISC34880
      GO TO 60                                                         ISC34890
   40 IF (NXWYPT .LE. 0) GO TO 110                                     ISC34900
      J4 = 2                                                           ISC34910
      IJ = NXXYY                                                       ISC34920
   50 IJ = IJ+1                                                        ISC34930
      IF (IJ .GT. NXXYYP) GO TO 110                                    ISC34940
      JJ = IJ+NYPSS                                                    ISC34950
      II = IJ+NXPSS                                                    ISC34960
   60 CONTINUE                                                         ISC34970
      IF (Z(IJ) .LE. ZMX(N)) GO TO 100                                 ISC34980
      L = 0                                                            ISC34990
   70 L = L+1                                                          ISC35000
      IF (L .GT. N) GO TO 100                                          ISC35010
      IF (Z(IJ) .LE. ZMX(L)) GO TO 70                                  ISC35020
      M = N+1                                                          ISC35030
   80 M = M-1                                                          ISC35040
      IF (M .LE. L) GO TO 90                                           ISC35050
      IXS(M) = IXS(M-1)                                                ISC35060
      IYS(M) = IYS(M-1)                                                ISC35070
      ZMX(M) = ZMX(M-1)                                                ISC35080
      GO TO 80                                                         ISC35090
   90 ZMX(L) = Z(IJ)                                                   ISC35100
      IXS(L) = II                                                      ISC35110
      IYS(L) = JJ                                                      ISC35120
  100 GO TO (30,50),J4                                                 ISC35130
  110 CONTINUE                                                         ISC35140
      RETURN                                                           ISC35150
      END                                                              ISC35160
C                                                                      ISC35170
      SUBROUTINE CHECKR(NN,NO)                                         ISC35180
C                  SUBROUTINE CHECKR (VERSION 86170), PART OF ISCLT.   ISC35190
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES, ISC35200
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC35210
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC35220
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY                            ISC35230
      COMMON /SORC/ NUMS,TYPE,DX,DY,H,ZS,TS,VEL,D,HB,BW,BL,NVS,VS(20),   ISC35240
     1FRQ(20),GAMMA(20),Q(6,6,4),QFLG,WAKE                             ISC35250
      IF (NN .GT. 0) GO TO 10                                          ISC35260
      JJ = NOCOMB(NG)                                                  ISC35270
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      II = NGT                                                          ISC35280
      GO TO 30                                                          ISC35290
   10 II = 0                                                            ISC35300
      I = 0                                                             ISC35310
   20 I = I+1                                                           ISC35320
      IF (I .GT. NN) GO TO 60                                           ISC35330
      JJ = NOCOMB(I)                                                    ISC35340
   30 IF (JJ .EQ. 0) GO TO 70                                           ISC35350
      DO 50 J=1,JJ                                                      ISC35360
      IF (IDSORC(J+II) .GE. 0) GO TO 40                                 ISC35370
      IF (NUMS .GT. IABS(IDSORC(J+II))) GO TO 50                        ISC35380
      IF (J .EQ. 1) GO TO 70                                            ISC35390
      IF (IDSORC(J+II-1) .GE. 0.AND.NUMS .LT. IDSORC(J+II-1)) GO TO 50  ISC35400
      GO TO 70                                                          ISC35410
   40 IF (NUMS .EQ. IDSORC(J+II)) GO TO 70                              ISC35420
   50 CONTINUE                                                          ISC35430
      II = II+JJ                                                        ISC35440
      IF (NN .GT. 0) GO TO 20                                           ISC35450
   60 NO = 0                                                            ISC35460
      GO TO 80                                                          ISC35470
   70 CONTINUE                                                          ISC35480
      NO = 1                                                            ISC35490
   80 RETURN                                                            ISC35500
      END                                                               ISC35510
C                                                                       ISC35520
      SUBROUTINE DISTR                                                  ISC35530
C                 SUBROUTINE DISTR (VERSION 86170), PART OF ISCLT.      ISC35540
C     CALC DISTANCE BETWEEN SOURCE AND RECEPTOR, DETERMINES IF RECEPTOR ISC35550
C     IS IN THE CALCULATION SECTOR OR NOT AND CALCULATES THE SMOOTHING  ISC35560
C     TERM                                                              ISC35570
      COMMON /DIST/ XB,YB,XYP,TNN,TR,TRI,ARG,RP,RPI                     ISC35580
      ARG = -1.0                                                        ISC35590
      XF = XB+XYP                                                       ISC35600
      F = XF*TNN                                                        ISC35610
C     DETERMINE IF INSIDE CALC SECTOR. IF NOT THEN NO CALC              ISC35620
      IF (ABS(YB) .GE. F) GO TO 10                                      ISC35630
C     CALC RADIAL DISTANCE BETWEEN SOURCE AND RECEPTOR                  ISC35640
      RP = SQRT(XF*XF+YB*YB)                                            ISC35650
      RPI = 1.0/RP                                                      ISC35660
C     CALC SMOOTHING TERM                                               ISC35670
      F = XF*RPI                                                        ISC35680
      IF (F .GT. 1.0) F = 1.0                                           ISC35690
      F = ABS(TR-ACOS(F))*TRI                                           ISC35700
      ARG = F*RPI                                                       ISC35710
   10 RETURN                                                            ISC35720
      END                                                               ISC35730
C                                                                       ISC35740
C                                                                       ISC35750
      FUNCTION FUNCT(X,IST,ISW9)                                        ISC35760
C                   FUNCTION FUNCT (VERSION 86170), PART OF ISCLT.    ISC35770
C     CALCULATES AVERAGE B FOR VERTICAL TERM OF DEPOSITION EQUATION     ISC35780
C     MODIFIED TO OPTIONALLY USE BRIGGS URBAN/MCELROY-POOLER 'B' VALUES ISC35790
      DIMENSION BU(38)                                                  ISC35800
      COMMON /FUNCS/ AS(38),BS(38),PS(6),QS(6),CS(6),DS(6),ASI(38),BSI(3ISC35810
     18),IA(7),JA(6),DST(33),IDP                                        ISC35820
      DATA BU/ 1.05481,                                                 ISC35830
     1        1.05481,1.07397,1.09147,1.10755,1.12880,1.15459,          ISC35840
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     *    1.27573,1.39840,  1.06277,1.11120,1.19463,  1.0,                  ISC35850
     *     .97423,.92683,.82729,.69084,.58298,.54401,                       ISC35860
     *   .89450,.89450,.77378,.66096,.59632,.54890,.52290,.51173,           ISC35870
     *    .50737,  .91156,.81821,.72180,.66096,.60730,.56473,               ISC35880
     *    .53115,.51551,.50788,.50452/                                      ISC35890
      XD = X*.001                                                          ISC35900
      M = IA(IST)+1                                                        ISC35910
      L = IA(IST+1)                                                        ISC35920
      IF (IST .EQ. 1) L = L-1                                              ISC35930
      I = JA(IST)                                                          ISC35940
      IF (ISW9 .NE. 4) AV=BS(I)                                            ISC35950
      IF (ISW9 .EQ. 4) AV=BU(I)                                            ISC35960
      DO 10 K=M,L                                                          ISC35970
      IF (XD .LE. DST(K-1)) GO TO 20                                       ISC35980
      I = I+1                                                              ISC35990
      IF (ISW9 .NE. 4) AV = AV + BS(I)                                     ISC36000
      IF (ISW9 .EQ. 4) AV = AV + BU(I)                                     ISC36010
   10 CONTINUE                                                             ISC36020
   20 FUNCT = AV/FLOAT(I-JA(IST)+1)                                        ISC36030
      RETURN                                                               ISC36040
      END                                                                  ISC36050
C                                                                          ISC36060
      SUBROUTINE VERTC1                                                    ISC36070
C                  SUBROUTINE VERTC1 (VERSION 86170), PART OF ISCLT.       ISC36080
C     CALCULATES THE VERTICAL TERM FOR THE CONCENTRATION EQUATION          ISC36090
      COMMON /VERT/SIGZI,SIGZ,HM,H,V,VSROU,BA                              ISC36100
      DATA SQ2PO2/1.253314137/                                             ISC36110
      V = 0.0                                                              ISC36120
      IF (SIGZI .GE. 0.0) GO TO 30                                         ISC36130
      A = SIGZ/HM                                                          ISC36140
      IF (A .GE. 1.6) GO TO 20                                             ISC36150
      B = H*H*SIGZI                                                        ISC36160
      IF (B .LT. -30.0) GO TO 30                                           ISC36170
      V = EXP(B)                                                           ISC36180
      B = 0.0                                                              ISC36190
   10 B = B+2.0                                                            ISC36200
      IF (B .GT. 6.0) GO TO 20                                             ISC36210
      TR = B*HM                                                            ISC36220
      TS = (TR-H)**2*SIGZI                                                 ISC36230
      IF (TS .LT. -10.0) GO TO 30                                          ISC36240
      TR = (TR+H)**2*SIGZI                                                 ISC36250
      V = V+EXP(TS)+EXP(TR)                                                ISC36260
      GO TO 10                                                             ISC36270
   20 V = SQ2PO2*A                                                         ISC36280
   30 CONTINUE                                                             ISC36290
      RETURN                                                               ISC36300
      END                                                                  ISC36310
C                                                                          ISC36320
      SUBROUTINE VERTC2(GAMMA)                                             ISC36330
C                  SUBROUTINE VERTC2 (VERSION 86170), PART OF ISCLT.       ISC36340
      COMMON /VERT/ SIGZI,SIGZ,HM,H,V,VSROU,BA                             ISC36350
C     CALCULATES THE VERTICAL TERM IN THE CONCENTRATION EQUATION WHEN      ISC36360
C     DEPOSITION IS OCCURRING                                              ISC36370
      V = 0.0                                                              ISC36380
      IF (SIGZI .GE. 0.0) GO TO 60                                         ISC36390
      H1 =-H+VSROU                                                         ISC36400
      H2 = H-VSROU                                                         ISC36410
```

```
      A = H2*H2*SIGZI                                                    ISC36420
      IF (A .LT. -40.0) GO TO 60                                         ISC36430
      B = H1*H1*SIGZI                                                    ISC36440
      IF (B .LT. -40.0) GO TO 10                                         ISC36450
      V = EXP(B)                                                         ISC36460
   10 IF (GAMMA .LE. 0.0) GO TO 20                                       ISC36470
      V = V+EXP(A)*GAMMA                                                 ISC36480
   20 A = 1.0                                                            ISC36490
      B = GAMMA                                                          ISC36500
      C = B*B                                                            ISC36510
      D = 0.0                                                            ISC36520
   30 D = D+2.0                                                          ISC36530
      TR = D*HM                                                          ISC36540
      TS = (TR-H2)**2*SIGZI                                              ISC36550
      IF (D .LE. 2.0.AND.TS .GT. -40.0) GO TO 40                         ISC36560
      IF (TS .LT. -10.0) GO TO 60                                        ISC36570
   40 VL = A*EXP(TS)                                                     ISC36580
      IF (GAMMA .LE. 0.0) GO TO 50                                       ISC36590
      TT = (TR+H1)**2*SIGZI                                              ISC36600
      TQ = (TR-H1)**2*SIGZI                                              ISC36610
      TR = (TR+H2)**2*SIGZI                                              ISC36620
      VL = VL+B*(EXP(TT)+EXP(TQ))+C*EXP(TR)                              ISC36630
      IF (VL .LE. V*1.0E-6) GO TO 50                                     ISC36640
      V = V+VL                                                           ISC36650
      A = B                                                              ISC36660
      B = C                                                              ISC36670
      C = C*GAMMA                                                        ISC36680
      GO TO 30                                                           ISC36690
   50 V = V+VL                                                           ISC36700
   60 CONTINUE                                                           ISC36710
      RETURN                                                             ISC36720
      END                                                                ISC36730
C                                                                        ISC36740
      SUBROUTINE VERTC3(GAMMA)                                           ISC36750
C                SUBROUTINE VERTC3 (VERSION 86170), PART OF ISCLT.       ISC36760
      COMMON /VERT/ SIGZI,SIGZ,HM,H,V,VSROU,BA                           ISC36770
      V = 0.0                                                            ISC36780
      IF (SIGZI .GE. 0.0) GO TO 40                                       ISC36790
      H1 = H-VSROU                                                       ISC36800
      A = H1*H1*SIGZI                                                    ISC36810
      IF (A .LT. -40.0) A = -40.0                                        ISC36820
      V = V+(BA*H1+VSROU)*EXP(A)                                         ISC36830
      A = 1.0                                                            ISC36840
      B = GAMMA                                                          ISC36850
      C = 0.0                                                            ISC36860
   10 C = C+2.0                                                          ISC36870
      TR = C*HM                                                          ISC36880
      TS = (TR-H1)                                                       ISC36890
      TR = (TR+H1)                                                       ISC36900
      TT = TS*TS*SIGZI                                                   ISC36910
      TQ = TR*TR*SIGZI                                                   ISC36920
      IF (C .LE. 2.0) GO TO 20                                           ISC36930
      IF (TT .LT. -10.0.AND.TQ .LT. -10.0) GO TO 40                      ISC36940
   20 IF (TT .LT. -40.0) TT = -40.0                                      ISC36950
      IF (TQ .LT. -40.0) TQ = -40.0                                      ISC36960
      VL = A*(BA*TS-VSROU)*EXP(TT)+B*(BA*TR+VSROU)*EXP(TQ)               ISC36970
      IF (GAMMA .LE. 0.0) GO TO 30                                       ISC36980
```

```
      IF (VL .LE. V*1.0E-6) GO TO 30                                    ISC36990
      V = V+VL                                                          ISC37000
      A = B                                                             ISC37010
      B = B*GAMMA                                                       ISC37020
      GO TO 10                                                          ISC37030
   30 V = V+VL                                                          ISC37040
   40 IF(V.LT.0.0) V=0.0                                                ISC37050
      RETURN                                                            ISC37060
      END                                                               ISC37070
C                                                                       ISC37080
      FUNCTION SIGMAZ(XP,IST)                                           ISC37090
C                     FUNCTION SIGMAZ (VERSION 86170), PART OF ISCLT.   ISC37100
C     CALCULATES THE STANDARD DEVIATION OF THE VERTICAL CONCENTRATION   ISC37110
C     DISTRIBUTION                                                      ISC37120
      COMMON /FUNCS/ AS(38),BS(38),PS(6),QS(6),CS(6),DS(6),ASI(38),BSI(3ISC37130
     18),IA(7),JA(6),DST(33),IDP                                        ISC37140
C                                                                       ISC37150
      XD = XP*.001                                                      ISC37160
      K = 13                                                            ISC37170
      IF (IST .EQ. 3) GO TO 30                                          ISC37180
      M = IA(IST)                                                       ISC37190
      L = IA(IST+1)-1                                                   ISC37200
      IF (IST .EQ. 1.AND.IDP .NE. 0) L = L-1                            ISC37210
      DO 10 K=M,L                                                       ISC37220
      IF (XD .LE. DST(K)) GO TO 20                                      ISC37230
   10 CONTINUE                                                          ISC37240
      K = L+1                                                           ISC37250
   20 K = K-M+JA(IST)                                                   ISC37260
   30 SIGMAZ = AS(K)*XD**BS(K)                                          ISC37270
      IF (IST .GT. 3.OR.IDP .NE.0) GO TO 40                             ISC37280
      IF (SIGMAZ .GT. 5000.0) SIGMAZ = 5000.0                           ISC37290
   40 CONTINUE                                                          ISC37300
      RETURN                                                            ISC37310
      END                                                               ISC37320
C                                                                       ISC37330
      FUNCTION VIRTZ(SIGZO,IST,X,HB10)                                  ISC37340
C                     FUNCTION VIRTZ (VERSION 86170), PART OF ISCLT.    ISC37350
C     CALCULATES VERTICAL VIRTUAL DISTANCE                              ISC37360
      COMMON /FUNCS/ AS(38),BS(38),PS(6),QS(6),CS(6),DS(6),ASI(38),BSI(3ISC37370
     18),IA(7),JA(6),DST(33),IDP                                        ISC37380
C                                                                       ISC37390
      XD = X*.001                                                       ISC37400
      XE = HB10*.001                                                    ISC37410
      K = 13                                                            ISC37420
      IF (IST .EQ. 3) GO TO 30                                          ISC37430
      M = IA(IST)                                                       ISC37440
      L = IA(IST+1)-1                                                   ISC37450
      IF (IST .EQ. 1) L = L-1                                           ISC37460
      DO 10 K=M,L                                                       ISC37470
      IF (XD .LE. DST(K)) GO TO 20                                      ISC37480
   10 CONTINUE                                                          ISC37490
      K = L+1                                                           ISC37500
   20 KK = K                                                            ISC37510
      K = K-M+JA(IST)                                                   ISC37520
   30 VIRTZ = (SIGZO*ASI(K))**BSI(K)-XE                                 ISC37530
      IF (VIRTZ .LT. 0.0) VIRTZ = 0.0                                   ISC37540
      IF (IST.EQ.3.OR.KK.GT.L.OR.VIRTZ+XD.LE.DST(KK)) GO TO 40          ISC37550
```

```
      K = KK+1                                                          ISC37560
      GO TO 20                                                          ISC37570
   40 VIRTZ = VIRTZ*1.0E3                                               ISC37580
      RETURN                                                            ISC37590
      END                                                               ISC37600
C                                                                       ISC37610
      FUNCTION VIRTY(SIGYO,IST)                                         ISC37620
C                     FUNCTION VIRTY (VERSION 86170), PART OF ISCLT.    ISC37630
C     CALCULATES LATERAL VIRTUAL DISTANCE                               ISC37640
      COMMON /FUNCS/ AS(38),BS(38),PS(6),QS(6),CS(6),DS(6),ASI(38),BSI(3ISC37650
     18),IA(7),JA(6),DST(33),IDP                                        ISC37660
      VIRTY = (SIGYO*PS(IST))**QS(IST)*1.0E3                            ISC37670
      RETURN                                                            ISC37680
      END                                                               ISC37690
      SUBROUTINE URBNYZ (X,KST,SY,SZ)                                   ISC37700
C** SUBROUTINE URBNYZ (VERSION 86170) PART OF ISCLT                     ISC37710
C     BRIGGS URBAN PARAMETERS SIGMA-Y,SIGMA-Z                           ISC37720
C     SIGMA-Y,Z (IN METERS) FROM PASQUILL STABILITY CLASS (KST)         ISC37730
C     AND DISTANCE FROM SOURCE, XM, IN METERS.                          ISC37740
      XM=X                                                              ISC37750
      GO TO (20,20,30,40,50,50), KST                                    ISC37760
20    SY=0.32*XM/SQRT(1.+0.0004*XM)                                     ISC37770
      SZ=0.24*XM*SQRT(1.+0.001*XM)                                      ISC37780
      GO TO 60                                                          ISC37790
30    SY=0.22*XM/SQRT(1.+0.0004*XM)                                     ISC37800
      SZ=0.2*XM                                                         ISC37810
      GO TO 60                                                          ISC37820
40    SY=0.16*XM/SQRT(1.+0.0004*XM)                                     ISC37830
      SZ=0.14*XM/SQRT(1.+0.0003*XM)                                     ISC37840
      GO TO 60                                                          ISC37850
50    SY=0.11*XM/SQRT(1.+0.0004*XM)                                     ISC37860
      SZ=0.08*XM/SQRT(1.+0.0015*XM)                                     ISC37870
60    IF(SZ .GT. 5000.) SZ=5000.                                        ISC37880
      RETURN                                                            ISC37890
      END                                                               ISC37900
      FUNCTION XVY (SYO,KST)                                            ISC37910
C** FUNCTION XVY (VERSION 86170) PART OF ISCLT                          ISC37920
C        XVY CALCULATES THE VIRTUAL DISTANCE NECESSARY TO               ISC37930
C        ACCOUNT FOR THE INITIAL CROSSWIND DISPERSION.                  ISC37940
C        BASED ON BRIGGS URBAN DISPERSION COEFFICIENTS                  ISC37950
C     VALUE RETURNED IS IN METERS.                                      ISC37960
      DIMENSION A(6)                                                    ISC37970
      DATA A/.32,.32,.22,.16,.11,.11/                                   ISC37980
      DATA B/.0004/                                                     ISC37990
C** DIRECT SOLUTION FOR URBAN DISPERSION                                ISC38000
70    XVY=(B*SYO**2+SQRT(B**2*SYO**4+4.*A(KST)**2*SYO**2))/             ISC38010
     *(2.*A(KST)**2)                                                    ISC38020
      RETURN                                                            ISC38030
       END                                                              ISC38040
      FUNCTION XVZ (SZO,KST)                                            ISC38050
C** FUNCTION XVZ (VERSION 86170) PART OF ISCLT                          ISC38060
C        XVZ CALCULATES THE VIRTUAL DISTANCE NECESSARY                  ISC38070
C        TO ACCOUNT FOR THE INITIAL VERTICAL DISPERSION.                ISC38080
C        BASED ON BRIGGS URBAN DISPERSION COEFFICIENTS                  ISC38090
C     VALUE RETURNED IS IN METERS.                                      ISC38100
      DIMENSION C(6),D(6)                                               ISC38110
      DATA C /1.E06,1.E06,.20,.14,.08,.08/                              ISC38120
```

```
      DATA D /1.E09,1.E09,0...0003,.0015,.0015/                          ISC38130
C     DIRECT SOLUTION FOR URBAN DISPERSION                               ISC38140
170   GO TO (180,180,190,200,200,200), KST                               ISC38150
C     SOLUTION TO THE CUBIC EQUATION                                     ISC38160
C     FROM CRC MATHEMATICAL TABLES                                       ISC38170
C     STABILITY A&B (180)                                                ISC38180
180   A=-C(KST)/3.                                                       ISC38190
      B=(2./27.-(SZO/240.)**2)*D(KST)                                    ISC38200
      S=B**2/4.+A**3/27.                                                 ISC38210
      IF(S .LT. 0.) GO TO 185                                            ISC38220
      S=SQRT(S)                                                          ISC38230
      E=1./3.                                                            ISC38240
      BA=(-B/2.+S)**E                                                    ISC38250
      BB=(-B/2.-S)**E                                                    ISC38260
      Y=BA+BB                                                            ISC38270
182   XVZ=Y-1000./3.                                                     ISC38280
      RETURN                                                             ISC38290
185   CS=(SZO/240.)**2*27./2.-1.                                         ISC38300
      TH=ACOS(CS)/3.                                                     ISC38310
      Y=2./3.*COS(TH)*1.E03                                              ISC38320
      GO TO 182                                                          ISC38330
C     STABILITY C(190)                                                   ISC38340
190   XVZ=SZO/C(KST)                                                     ISC38350
      RETURN                                                             ISC38360
C     STABILITY D,E,&F (200)                                             ISC38370
200   XVZ=(D(KST)*SZO**2+SQRT(D(KST)**2*SZO**4+4.*C(KST)**2              ISC38380
     **SZO**2))/(2.*C(KST)**2)                                           ISC38390
      RETURN                                                             ISC38400
       END                                                               ISC38410
       SUBROUTINE MPR1LT(KST,TS,TEMP,F,D,VS,UPL,DELH,DTHDZ,DISTF)        ISC38420
C     SUBROUTINE MPR1 (VERSION 86170) PART OF ISCLT                      ISC38430
C     MAJOR PORTIONS OF THIS CODE CAME FROM THE                          ISC38440
C     MPTER MODEL.                                                       ISC38450
C        PLUME RISE CALCULATION                                          ISC38460
      DELT=TS-TEMP                                                       ISC38470
      IF (KST.GT.4) GO TO 70                                             ISC38480
C        PLUME RISE FOR UNSTABLE CONDITIONS                              ISC38490
      IF (TS.LT.TEMP) GO TO 80                                           ISC38500
      IF (F.GE.55.) GO TO 60                                             ISC38510
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F<55)         ISC38520
C        FOUND BY EQUATING BRIGGS(1969) EQ 5.2, P.59 WITH COMBINATION OFISC38530
C        BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F<55.            ISC38540
      DTMB=0.0297*TS*VS**0.33333/D**0.66667                              ISC38550
      IF (DELT.LT.DTMB) GO TO 80                                         ISC38560
C        DISTANCE OF FINAL BUOYANT RISE(0.049 IS 14*3.5/1000)            ISC38570
C        BRIGGS(1971) EQN. 7,F<55, AND DIST TO FINAL RISE IS 3.5 XSTAR   ISC38580
C        DISTF IN KILOMETERS                                             ISC38590
      DISTF=0.049*F**0.625                                               ISC38600
C        COMBINATION OF BRIGGS(1971) EQNS. 6 AND 7, PAGE 1031 FOR F<55.  ISC38610
      DELH=21.425*F**0.75/UPL                                            ISC38620
      GO TO 100                                                          ISC38630
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F>55)         ISC38640
C        FOUND BY EQUATING BRIGGS(1969) EQ 5.2, P.59 WITH COMBINATION OFISC38650
C         BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F>55.           ISC38660
60    DTMB=0.00575*TS*VS**0.66667/D**0.33333                             ISC38670
      IF (DELT.LT.DTMB) GO TO 80                                         ISC38680
C        DISTANCE OF FINAL BUOYANT RISE (0.119 IS 34*3.5/1000)           ISC38690
```

```
C        BRIGGS(1971) EQN. 7, F>55, AND DIST TO FINAL RISE IS 3.5 XSTAR.ISC38700
C        DISTF IN KILOMETERS                                            ISC38710
      DISTF=0.119*F**0.4                                                ISC38720
C        COMBINATION OF BRIGGS(1971) EQNS. 6 AND 7, PAGE 1031 FOR F>55. ISC38730
      DELH=38.71*F**0.6/UPL                                             ISC38740
      GO TO 100                                                         ISC38750
C        PLUME RISE FOR STABLE CONDITIONS.                              ISC38760
 70   S=9.80616*DTHDZ/TEMP                                              ISC38770
      IF (TS.LT.TEMP) GO TO 90                                          ISC38780
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(STABLE)      ISC38790
C        FOUND BY EQUATING BRIGGS(1975) EQ 59, P. 96 FOR STABLE BUOYANCYISC38800
C        RISE WITH BRIGGS(1969) EQ 4.28, P. 59 FOR STABLE MOMENTUM RISE.ISC38810
      DTMB=0.019582*TEMP*VS*SQRT(S)                                     ISC38820
      IF (DELT.LT.DTMB) GO TO 90                                        ISC38830
C        STABLE BUOYANT RISE FOR WIND CONDITIONS.(WIND NOT ALLOWED LOW  ISC38840
C        ENOUGH TO REQUIRE STABLE RISE IN CALM CONDITIONS.)             ISC38850
C        BRIGGS(1975) EQ 59, PAGE 96.                                   ISC38860
      DELH=2.6*(F/(UPL*S))**0.333333                                    ISC38870
C        COMBINATION OF BRIGGS(1975) EQ 48 AND EQ 59. NOTE DISTF IN KM. ISC38880
      DISTF=0.0020715*UPL/SQRT(S)                                       ISC38890
      GO TO 100                                                         ISC38900
C        UNSTABLE-NEUTRAL MOMENTUM RISE                                 ISC38910
C        BRIGGS(1969) EQN. 5.2, PAGE 59 NOTE: MOST ACCURATE WHEN VS/U>4;ISC38920
C        TENDS TO OVERESTIMATE RISE WHEN VS/U<4 (SEE BRIGGS(1975) P. 78,ISC38930
C         FIGURE 4.)                                                    ISC38940
 80   DELH=3.*VS*D/UPL                                                  ISC38950
      DISTF=0.                                                          ISC38960
      GO TO 100                                                         ISC38970
C        STABLE MOMENTUM RISE                                           ISC38980
 90   DHA=3.*VS*D/UPL                                                   ISC38990
C        BRIGGS(1969) EQUATION 4.28, PAGE 59                            ISC39000
      DELH=1.5*(VS*VS*D*D*TEMP/(4.*TS*UPL))**0.333333/S**0.166667       ISC39010
      IF (DHA.LT.DELH) DELH=DHA                                         ISC39020
      DISTF=0.                                                          ISC39030
C        STORE OFF PLUME HEIGHT(ETC.) FOR THIS SOURCE FOR USE WITH      ISC39040
C        OTHER RECEPTORS.                                               ISC39050
 100   RETURN                                                           ISC39060
       END                                                              ISC39070
EOF:3907
0:
END ED. NO CORRECTIONS APPLIED
```

APPENDIX C

EXAMPLE EXECUTIONS OF THE ISC SHORT-TERM MODEL (ISCST) COMPUTER PROGRAM

C.1 INTRODUCTION

The following examples are problem runs using the ISC short-term (ISCST) program to model the hypothetical potash processing plant described in Section 2.6. The examples consist of two executions of the ISCST program over one "worst-case" day of meteorological data. The first run calculates average concentration and the second run calculates total deposition. The topics covered in this appendix are: the procedure for setting up the required input data; and examples of the program output.

In this section, it is assumed that the reader is familiar with Section 2.6, which discusses the hypothetical potash processing plant and provides the reader with figures and tables of specific input data information. Also, the reader should be familiar with Table 3-4 presented in Section 3.2.3.a, which provides the user with the format and description of all card input data parameters.

C.2 EXAMPLE CONCENTRATION RUN

C.2.1 Input Data Set-Up Procedure

Figure C-1 shows the 135 lines of card input data values required to compute the desired average concentrations for the hypothetical potash processing plant.

Note that some lines are blank and are to be included in the input data deck as blank lines. This is because a zero value, which is equivalent to a blank space, is the proper value of an input data parameter or because it is convenient to exercise the program's default capabilities for certain input parameters.

CARD GROUP	CARD NUMBER	CARD COLUMN
		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
1	1	-- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION --
2	2	1 1 2 0 0 2 1 1 1 1 1 1 0 1 1 0 2 1 2 2 2 2 2
	3	16 19 19 64 5
3	4	-3000 -2000 -1500 -1250 -1000 -800 -600 -400
	5	-200 0 200 400 600 800 1000 1250
	6	1500 2000 3000
	7	-3000 -2000 -1500 -1250 -1000 -800 -600 -400
	8	-200 0 200 400 600 800 1000 1250
	9	1500 2000 3000
	10	555.0 317.0
	11	620.0 318.0
	12	685.0 320.0
	13	735.0 322.0
	14	800.0 326.0
	15	860.0 331.0
	16	900.0 336.0
	17	920.0 341.0
	18	940.0 346.0
	19	940.0 351.0
	20	935.0 356.0
	21	910.0 1.0
	22	950.0 6.0
	23	1015.0 11.0
	24	1055.0 16.0
	25	1075.0 21.0
	26	1075.0 26.0
	27	1045.0 31.0
	28	995.0 36.0
	29	910.0 41.0
	30	855.0 43.0
	31	755.0 45.0
	32	620.0 47.0
	33	525.0 49.0
	34	460.0 51.0
	35	355.0 56.0
	36	355.0 66.0
	37	355.0 76.0
	38	355.0 86.0
	39	350.0 96.0
	40	345.0 106.0
	41	335.0 116.0
	42	325.0 126.0
	43	380.0 136.0
	44	420.0 141.0
	45	450.0 146.0
	46	480.0 151.0
	47	505.0 156.0
	48	535.0 161.0
	49	575.0 166.0

Figure C-1. Card input data values for the hypothetical potash processing plant concentration run.

CARD GROUP	CARD NUMBER	CARD COLUMN
		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
	50	620.0 171.0
	51	665.0 176.0
	52	705.0 181.0
	53	730.0 186.0
	54	745.0 191.0
	55	755.0 196.0
	56	755.0 201.0
	57	745.0 206.0
	58	730.0 211.0
	59	705.0 216.0
	60	690.0 221.0
	61	690.0 226.0
	62	690.0 231.0
	63	680.0 236.0
	64	665.0 241.0
	65	645.0 246.0
	66	615.0 251.0
	67	575.0 256.0
	68	530.0 261.0
	69	475.0 266.0
	70	410.0 271.0
	71	365.0 276.0
	72	365.0 286.0
	73	410.0 296.0
4	74	1 2 2 1 2
	75	1 2 -11 12 -15 16 1 16
5	76	
	77	
	78	1
	79	
	80	
	81	
	82	
	83	14913 64 14918 64
6	84	12 63 .1 -13.3 -13.3 0 10.0 26.6
	85	.1 .4 .28 .12 .06 .04
	86	.001 .007 .019 .037 .061 .099
	87	1.0 .82 .72 .65 .59 .5
	88	21 60 .13 20 0 0 .9 1 4.7
	89	.1 .4 .28 .12 .06 .04
	90	.001 .007 .019 .037 .061 .099
	91	1.0 .82 .72 .65 .59 .5
	92	31 60 .13 30 0 0 2.6 1 4.7
	93	.1 .4 .28 .12 .06 .04
	94	.001 .007 .019 .037 .061 .099
	95	1.0 .82 .72 .65 .59 .5
	96	41 60 .13 40 0 0 4.3 1 4.7
	97	.1 .4 .28 .12 .06 .04
	98	.001 .007 .019 .037 .061 .099

Figure C-1. (Continued)

CARD GROUP	CARD NUMBER	CARD COLUMN															
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
	99		1.0		.82		.72		.65		.59		.5				
	100	51	60	.13		49		0	0	6.1	1	4.7					
	101		.1		.4		.28		.12		.06		.04				
	102		.001		.007		.019		.037		.061		.099				
	103		1.0		.82		.72		.65		.59		.5				
	104	61	60	.13		59		0	0	7.8	1	4.7					
	105		.1		.4		.28		.12		.06		.04				
	106		.001		.007		.019		.037		.061		.099				
	107		1.0		.82		.72		.65		.59		.5				
	108	71	60	.13		69		0	0	9.6	1	4.7					
	109		.1		.4		.28		.12		.06		.04				
	110		.001		.007		.019		.037		.061		.099				
	111		1.0		.82		.72		.65		.59		.5				
	112	81	60	.13		79		0	0	11.3	1	4.7					
	113		.1		.4		.28		.12		.06		.04				
	114		.001		.007		.019		.037		.061		.099				
	115		1.0		.82		.72		.65		.59		.5				
	116	91	60	.13		89		0	0	13.0	1	4.7					
	117		.1		.4		.28		.12		.06		.04				
	118		.001		.007		.019		.037		.061		.099				
	119		1.0		.82		.72		.65		.59		.5				
	120	101	60	.13		99		0	0	14.8	1	4.7					
	121		.1		.4		.28		.12		.06		.04				
	122		.001		.007		.019		.037		.061		.099				
	123		1.0		.82		.72		.65		.59		.5				
	124	111	60	.13		109		0	0	16.5	1	4.7					
	125		.1		.4		.28		.12		.06		.04				
	126		.001		.007		.019		.037		.061		.099				
	127		1.0		.82		.72		.65		.59		.5				
	128	121	00	2.63		121		0	0	22.5	11.6	10.8					
	129	131	00	2.63		144		0	0	22.5	11.6	10.8					
	130	141	00	2.63		167		0	0	22.5	11.6	10.8					
	131	151	00	2.63		190		0	0	22.5	11.6	10.8					
	132	1600	00	5.0		201		0	0	50.0	340	8		1	25	90	50
	133		1		1		1		1		1		1		1		5
	134		5		5		5		5		5		5		5		1
	135		1		1		1		1		1		1		1		1

Figure C-1. (Continued)

The best procedure for setting up the input data for a problem run is to consider all of the ISCST program's input data parameters covered in Table 3-4. As each input data parameter in Table 3-4 is examined, Section 2.6 is consulted, when necessary, in order to obtain the applicable information for that parameter.

a. Card Group 1. The first input data parameter discussed in Table 3-4 is TITLE whose alphanumeric heading data occupies the first 60 characters of the first line as shown in Figure C-1.

b. Card Group 2. The second line consists of the ISW array where each entry is entered in 2-column integer fields. Because it is desired to calculate concentration values, a "1" is entered in column 2 according to ISW(1) in Table 3-4. Figure 2-3 is an illustration of the Cartesian receptor grid at which average concentration values are calculated. A "1" is entered in column 4 for ISW(2) to indicate that the receptor grid locations are referenced by the Cartesian coordinate system. Note that a "3" could not be entered in column 4 to indicate that a receptor grid will be generated by the program because the receptor grid used does not have equally spaced grid points. Although no mention of discrete receptor points is made in Section 2.6, this problem run includes 64 discrete receptor points which are oriented with respect to the receptor grid origin* by distance and direction. Hence, a "2" is entered in column 6 for ISW(3) to indicate to the program that the discrete receptor points are referenced as polar coordinates. ISW(4) indicates whether or not receptor terrain elevations are input. According to

*The origin for this example problem run has been (arbitrarily) defined at the center of the ore storage pile (Source 1).

Section 2.6, the terrain is relatively flat; hence, a "0" is entered in column 8 for ISW(4). Column 10 for ISW(5) is set to "0" since no input tape is desired. Column 12 for ISW(6) is set to "2" in order to obtain a listing of all input data. ISW(7) through ISW(14) indicate which time periods are considered by the program for the average concentration calculations. According to Section 2.6, only 24-hour average concentration values are desired. The descriptions of ISW(7) through ISW(14) in Table 3-4 state that only ISW(14) should be set to "1." Hence, columns 13 to 26 for ISW(7) to ISW(13) are blank (equivalent to "0") and column 28 for ISW(14) is set to "1." ISW(15) through ISW(18) indicate to the program which type of output tables are produced. For the purpose of illustration, all types of output tables are produced. A "1" is entered in columns 30, 32 34, and 36 for ISW(15) through ISW(18) for "N"-day, daily, highest and second highest, and maximum 50 tables, respectively. The hourly meteorological data reside on a file in a format generated by the preprocessor program; hence a "1" is entered in column 38 for ISW(19) to indicate to the program the format of the hourly meteorological data. According to Section 2.6, a rural mode is desired; hence, a "0" is entered in column 40 for ISW(20). The descriptions of ISW(21) and ISW(22) indicate whether or not the user should provide wind-profile exponents and vertical potential temperature gradients. Because no site-specific wind-profile exponents and vertical potential temperature gradients are given in Section 2.6, column 41 for ISW(21) and column 42 for ISW(22) are set to "1" in order to use the program default values. ISW(23) indicates whether or not scalars are input to vary the average emission rates for <u>all</u> sources. According to Section 2.6, only one source (the ore pile) has a variational emission rate. A "0" is then entered in column 46 of ISW(23) to indicate that this option is not desired for all sources. Because wake effects are to be considered, the distance-dependent plume rise should be

used. This is indicated by setting ISW(24) to "2". The physical stack heights of all sources (in this example, only Source 16 is considered) are not modified due to stack-tip downwash, which is indicated by setting ISW(25) to "1". ISW(26), ISW(27), ISW(28), ISW(29) and ISW(30) were all set to "2" indicating that buoyancy induced dispersion was not considered, processing of calm winds was not performed, the regulatory mode was not chosen, a pollutant other than SO_2 was modeled and an input debug mode was not chosen, respectively.

The second line of Card Group 2 (the third card image) completes this Card Group as shown in Figure C-1. A "16" is entered for the number of sources (NSOURC) in columns 1-6. This value is obtained from Table 2-15 which lists all sources required to model the hypothetical potash processing plant. The next three parameters discussed in this Card Group pertain to the size of the receptor grid and number of discrete receptor points. By counting the number of X- and Y-axis grid points in Figure 2-3, a "19" value is entered in both columns 7-12 and 13-18 for parameters NXPNTS and NYPNTS. For the purpose of illustration, 64 discrete receptor points are used in this example run. NGROUP specifies the number of source group combinations desired. According to Section 2.6, it is of interest to see the contributions from the ore pile (Source 1), the conveyor belt (Sources 2-11), the roof monitor (Sources 12-15), the stack (Source 16), and the plant as a whole (Sources 1-16). Hence, a "5" is entered in column 30 for the number of source groups. Columns 31-36 for IPERD are left blank because all 24-hour time periods per day are to be printed. IPERD is intended for use only for time periods less than 24 hours. The following two parameters, NHOURS and NDAYS, are not applicable for this example run because these parameters apply only when hourly meteorological data are in a card image format (ISW(19) = "2"); the program then ignores any data contained in columns 37 through 48.

c. Card Group 3. This Card Group contains the locations of the receptor grid points and discrete receptor points. For this example problem run, this Card Group consists of lines (card images) 4 through 73 as shown in Figure C-1. According to Table 3-4, the X-axis grid locations are entered first in GRIDX with 8 values per line in ten-column fields continuing onto other lines (card images) as needed. Similarly, the Y-axis locations are then entered in GRIDY beginning a new line (card image) in the same fashion as the X-axis locations. Because the receptor terrain is relatively flat, no receptor terrain elevations are entered for GRIDZ. It is assumed that the receptor grid values represented in Figure 2-3 are in meters which are the units required by the program. Beginning with the seventh line (card image) of this Card Group, 64(NXWYPT) discrete receptor cards were entered. Each card consists of XDIS, YDIS, and GRIDZ for 1 receptor. Since receptor elevations were not considered, the last entry in each card (GRIDZ) was left blank.

d. Card Group 4. Because source group combinations are desired in this example problem run (NGROUP>"0"), it is necessary to specify which sources constitute each source group. The first line of this Card Group consists of the values entered for parameter NSOGRP. According to Section 2.6, the source numbers which define each source group are 1, 2-11, 12-15, 16, and 1-16. Values of "1", "2", "2", "1", and "2" are entered in columns 4, 8, 12, 16, and 20, respectively, for NSOGRP because each value is the number of source numbers which must be read from the IDSOR array in order to define a source group. The next line (parameter IDSOR) consists of the source numbers which define each source group. Note that the minus sign preceding a source number implies inclusive summing from the previous source number entered to the source number with the minus sign.

e. Card Group 5. Because no special wind-profile exponents and vertical potential temperature gradients are considered, parameters ISW(21) and ISW(22) described in Card Group 2 are set to "1," directing the program not to read the first two parameters, PDEF and DTHDEF, of this Card Group. Hence, the first line of this Card Group consists of parameters ZR and UCATS. This line is completely blank because it is assumed that the wind speed reference height is the default value (10 meters) and because no special consideration is mentioned in Section 2.6 regarding wind speed categories. Similarly, the next line is blank because all parameters contained on the line may default to program-provided values. That is, the default values for TK, IQUN, and ICHIUN may be used since the emission rate units of all sources given in Table 2-15 are the same as the program's default units and it is assumed that the desired units of the average concentration values are the same as the program's default units. Also, no mention is made in Section 2.6 regarding chemical depletion (DECAY). Furthermore, it is assumed that the hourly meteorological data file is associated with FORTRAN logical unit number 9 (the program's default value for IMET). The next five lines of this Card Group (the third through seventh line of this Card Group), consist of the IDAY array and are read by the program since ISW(19) equals "1." In this array, the Julian Day of the "worst-case" day of meteorological data (not discussed in Section 2.6) is specified. For this case, Julian Day 51 was chosen. The last line of this Card Group contains input data parameters which also pertain to the hourly meteorological data file and must be entered since ISW(19) equals "1." The surface and upper air station numbers and the years of the data are entered according to the formats of parameters ISS, ISY, IUS, and IUY described in Table 3-4.

f. Card Group 6. This Card Group consists of all source data whose values are provided by Tables 2-14, 2-15, and 2-16 in Section 2.6. For each of the 16 sources, one main card of values contains most, if not all, of the data required for a source. This card consists of parameters NSO through HW described in Table 3-4. According to Section 2.6, the ore pile (Source 1) and the conveyor belt (Sources 2-11) have significant particulate emissions which requires 6 gravitational particulate categories of data as shown in Table 2-14. Hence, a "6" is entered in column 9 for NVS for Sources 1-11 which directs the program to read the gravitational particulate data for PHI, VSN, and GAMMA immediately following the main source card for which the particulate data are applicable. Because particulate emissions from sources 12-16 do not have significant settling velocities, column 9 for NVS is "0" and no particulate data are read by the program for these sources. Because the emission rate for the ore pile (Source 1) varies depending on the hour of the day (see Table 2-16), a "3" is entered in column 10 for QFLG for Source 1. The "3" value, which is the value required by the program in order to vary emission rates for each hour of the day, directs the program to read one set of 24 source emission rate scalars in QTK. Note that QTK is read after all other source input data are entered and consists of the last three lines (card images) of this Card Group. According to Table 2-16, the emission rate for Source 1 equals 0.1 grams per second per square meter for hours 01-07 and 16-24, and equals 0.5 for hours 08-15. A value of 0.1 is entered in columns 11-18 for the emission rate Q for Source 1. Then, scalar values of 1.0 are entered for the first seven values (hours 01-07) and for the last nine values (hours 16-24) in QTK since no scaling is needed for the emission rate of Source 1 for those hours. The eighth through fifteenth scalar values (hours 08-15) equal 5.0 since it is desired to scale the source emission rate from 0.1 to 0.5 for those hours. The values in QTK are entered in 8 ten-column

fields and continue onto other lines (card images) as needed. In this case, QTK consists of three lines.

The card deck described above completes the required card input data for computing the desired average concentration values for the hypothetical potash processing plant. Because the hourly meteorological data are read from an external file (because ISW(19) = "1"), Card Group 7 is not read by the program. The external hourly meteorological file must be assigned and associated to FORTRAN logical unit 9 before execution of the program.

C.2.2 Output Format

Figures C-2 through C-8 illustrate the content and format of the print output produced by this example run. Figures C-2 and C-3 are generated since ISW(6) equals "2" in this problem run. Figure C-3 is a listing of the one day of hourly meteorological data. Because the program found distances between sources and receptors less than 1 meter, a diagnostic table is printed, as shown in Figure C-4, which lists all source-receptor combinations found and the distance computed between each combination. Note that a negative distance implies that the receptor lies within the boundaries of the source. Figure C-5 shows one table produced by this example run for the ISW(16) option. Note that the heading of the table identifies the day, averaging period and source group that represents the average concentration values printed for all receptors. Also, note that the average concentration values printed for the receptor grid provide ease of interpretation of the impact of the pollutant over the receptor grid domain. That is, the table format allows one to obtain a "visual" picture of the pollutant's pattern or trend. This features occurs only with Cartesian receptor grids because the receptor grid locations are entered in ascending order as shown in Figure C-1. An illustration of an "N"-day table generated by the ISW(15) option is shown in

FIGURE C-2. Listing of the input data for the hypothetical potash processing plant concentration run.

```
          *** --  HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION  -- ***

 CALCULATE (CONCENTRATION=1,DEPOSITION=2)                              ISW(1) =   1
 RECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POLAR=2 OR 4)               ISW(2) =   1
 DISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2)                      ISW(3) =   2
 TERRAIN ELEVATIONS ARE READ (YES=1,NO=0)                              ISW(4) =   0
 CALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0)                         ISW(5) =   0
 LIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2)                      ISW(6) =   2

 COMPUTE AVERAGE CONCENTRATION (OR TOTAL DEPOSITION)
 WITH THE FOLLOWING TIME PERIODS:
   HOURLY (YES=1,NO=0)                                                 ISW(7) =   0
   2-HOUR (YES=1,NO=0)                                                 ISW(8) =   0
   3-HOUR (YES=1,NO=0)                                                 ISW(9) =   0
   4-HOUR (YES=1,NO=0)                                                ISW(10) =   0
   6-HOUR (YES=1,NO=0)                                                ISW(11) =   0
   8-HOUR (YES=1,NO=0)                                                ISW(12) =   0
   12-HOUR (YES=1,NO=0)                                               ISW(13) =   0
   24-HOUR (YES=1,NO=0)                                               ISW(14) =   1
 PRINT 'N'-DAY TABLE(S) (YES=1,NO=0)                                  ISW(15) =   1

 PRINT THE FOLLOWING TYPES OF TABLES WHOSE TIME PERIODS ARE
 SPECIFIED BY ISW(7) THROUGH ISW(14):
   DAILY TABLES (YES=1,NO=0)                                          ISW(16) =   1
   HIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0)                       ISW(17) =   1
   MAXIMUM 50 TABLES (YES=1,NO=0)                                     ISW(18) =   1
 METEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2)            ISW(19) =   1
 RURAL-URBAN OPTION (RU.=0,UR. MODE 1=1,UR. MODE 2=2,UR. MODE 3=3)    ISW(20) =   0
 WIND PROFILE EXPONENT VALUES (DEFAULTS=1,USER ENTERS=2,3)            ISW(21) =   1
 VERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2,3)     ISW(22) =   1
 SCALE EMISSION RATES FOR ALL SOURCES (NO=0,YES>0)                    ISW(23) =   0
 PROGRAM CALCULATES FINAL PLUME RISE ONLY (YES=1,NO=2)                ISW(24) =   2
 PROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1)          ISW(25) =   1
 PROGRAM USES BUOYANCY INDUCED DISPERSION (YES=1,NO=2)                ISW(26) =   2
 CONCENTRATIONS DURING CALM PERIODS SET = 0 (YES=1,NO=2)              ISW(27) =   2
 DEFAULT OPTION CHOSEN (YES=1,NO=2)                                   ISW(28) =   2
 TYPE OF POLLUTANT TO BE MODELLED (1=SO2,2=OTHER)                     ISW(29) =   2
 DEBUG OPTION CHOSEN (1=YES,2=NO)                                     ISW(30) =   2

 NUMBER OF INPUT SOURCES                                              NSOURC =  16
 NUMBER OF SOURCE GROUPS (=0,ALL SOURCES)                             NGROUP =   5
 TIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS)                 IPERD =   0
 NUMBER OF X (RANGE) GRID VALUES                                      NXPNTS =  19
 NUMBER OF Y (THETA) GRID VALUES                                      NYPNTS =  19
 NUMBER OF DISCRETE RECEPTORS                                         NXNYPT =  64
 SOURCE EMISSION RATE UNITS CONVERSION FACTOR                              TK=.10000+007
 HEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED                     ZR =  10.00  METERS
 LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA                            IMET =   9
 DECAY COEFFICIENT FOR PHYSICAL OR CHEMICAL DEPLETION                 DECAY = .000000
 SURFACE STATION NO.                                                    ISS = 14913
 YEAR OF SURFACE DATA                                                   ISY = 64
 UPPER AIR STATION NO.                                                  IUS = 14918
 YEAR OF UPPER AIR DATA                                                 IUY = 64
 ALLOCATED DATA STORAGE                                               LIMIT = 43500 WORDS
```

FIGURE C-2. (continued)

```
REQUIRED DATA STORAGE FOR THIS PROBLEM RUN                    MIMIT = 18211 WORDS
```

FIGURE C-2. (continued)

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

*** METEOROLOGICAL DAYS TO BE PROCESSED ***
(IF=1)

```
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0           0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
```

*** NUMBER OF SOURCE NUMBERS REQUIRED TO DEFINE SOURCE GROUPS ***
(NSOGRP)

1, 2, 2, 1, 2,

*** SOURCE NUMBERS DEFINING SOURCE GROUPS ***
(IDSOR)

1, 2, -11, 12, -15, 16, 1, 16,

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY					
	1	2	3	4	5	6
A	.70000-001	.70000-001	.70000-001	.70000-001	.70000-001	.70000-001
B	.70000-001	.70000-001	.70000-001	.70000-001	.70000-001	.70000-001
C	.10000+000	.10000+000	.10000+000	.10000+000	.10000+000	.10000+000
D	.15000+000	.15000+000	.15000+000	.15000+000	.15000+000	.15000+000
E	.35000+000	.35000+000	.35000+000	.35000+000	.35000+000	.35000+000
F	.55000+000	.55000+000	.55000+000	.55000+000	.55000+000	.55000+000

FIGURE C-2. (continued)

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000	.00000	.00000	.00000	.00000	.00000
B	.00000	.00000	.00000	.00000	.00000	.00000
C	.00000	.00000	.00000	.00000	.00000	.00000
D	.00000	.00000	.00000	.00000	.00000	.00000
E	.20000-001	.20000-001	.20000-001	.20000-001	.20000-001	.20000-001
F	.35000-001	.35000-001	.35000-001	.35000-001	.35000-001	.35000-001

*** X-COORDINATES OF RECTANGULAR GRID SYSTEM ***
(METERS)

-3000.0, -2000.0, -1500.0, -1250.0, -1000.0, -800.0, -600.0, -400.0, -200.0, .0,
200.0, 400.0, 600.0, 800.0, 1000.0, 1250.0, 1500.0, 2000.0, 3000.0,

*** Y-COORDINATES OF RECTANGULAR GRID SYSTEM ***
(METERS)

-3000.0, -2000.0, -1500.0, -1250.0, -1000.0, -800.0, -600.0, -400.0, -200.0, .0,
200.0, 400.0, 600.0, 800.0, 1000.0, 1250.0, 1500.0, 2000.0, 3000.0,

*** RANGE,THETA COORDINATES OF DISCRETE RECEPTORS ***
(METERS,DEGREES)

(555.0, 317.0), (620.0, 318.0), (685.0, 320.0), (735.0, 322.0), (800.0, 326.0),
(860.0, 331.0), (900.0, 336.0), (920.0, 341.0), (940.0, 346.0), (940.0, 351.0),
(935.0, 356.0), (910.0, 1.0), (950.0, 6.0), (1015.0, 11.0), (1055.0, 16.0),
(1075.0, 21.0), (1075.0, 26.0), (1045.0, 31.0), (995.0, 36.0), (910.0, 41.0),
(855.0, 43.0), (755.0, 45.0), (620.0, 47.0), (525.0, 49.0), (460.0, 51.0),
(355.0, 56.0), (355.0, 66.0), (355.0, 76.0), (355.0, 86.0), (350.0, 96.0),
(345.0, 106.0), (335.0, 116.0), (325.0, 126.0), (380.0, 136.0), (420.0, 141.0),
(450.0, 146.0), (480.0, 151.0), (505.0, 156.0), (535.0, 161.0), (575.0, 166.0),
(620.0, 171.0), (665.0, 176.0), (705.0, 181.0), (730.0, 186.0), (745.0, 191.0),
(755.0, 196.0), (755.0, 201.0), (745.0, 206.0), (730.0, 211.0), (705.0, 216.0),
(690.0, 221.0), (690.0, 226.0), (690.0, 231.0), (680.0, 236.0), (665.0, 241.0),
(645.0, 246.0), (615.0, 251.0), (575.0, 256.0), (530.0, 261.0), (475.0, 266.0),
(410.0, 271.0), (365.0, 276.0), (365.0, 286.0), (410.0, 296.0), (

FIGURE C-2. (Continued)

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (GRAMS/SEC) TYPE=2 (GRAMS/SEC) *PER METER**2	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	HEIGHT (METERS)	TEMP. TYPE=0 (DEG.K); VERT.DIM TYPE=1 (METERS)	EXIT VEL. TYPE=0 (M/SEC); HORZ.DIM TYPE=1,2 (METERS)	DIAMETER TYPE=0 (METERS)	BLDG. HEIGHT TYPE=0 (METERS)	BLDG. LENGTH TYPE=0 (METERS)	BLDG. WIDTH TYPE=0 (METERS)
1	2	0	6	.10000+000	-13.3	-13.3	.0	10.00	.00	26.60	.00	.00	.00	.00
2	1	0	6	.13000+000	20.0	.0	.0	.90	1.00	4.70	.00	.00	.00	.00
3	1	0	6	.13000+000	30.0	.0	.0	2.60	1.00	4.70	.00	.00	.00	.00
4	1	0	6	.13000+000	40.0	.0	.0	4.30	1.00	4.70	.00	.00	.00	.00
5	1	0	6	.13000+000	49.0	.0	.0	6.10	1.00	4.70	.00	.00	.00	.00
6	1	0	6	.13000+000	59.0	.0	.0	7.80	1.00	4.70	.00	.00	.00	.00
7	1	0	6	.13000+000	69.0	.0	.0	9.60	1.00	4.70	.00	.00	.00	.00
8	1	0	6	.13000+000	79.0	.0	.0	11.30	1.00	4.70	.00	.00	.00	.00
9	1	0	6	.13000+000	89.0	.0	.0	13.00	1.00	4.70	.00	.00	.00	.00
10	1	0	6	.13000+000	99.0	.0	.0	14.80	1.00	4.70	.00	.00	.00	.00
11	1	0	6	.13000+000	109.0	.0	.0	16.50	1.00	4.70	.00	.00	.00	.00
12	1	0	0	.26300+001	121.0	.0	.0	22.50	11.60	10.80	.00	.00	.00	.00
13	1	0	0	.26300+001	144.0	.0	.0	22.50	11.60	10.80	.00	.00	.00	.00
14	1	0	0	.26300+001	167.0	.0	.0	22.50	11.60	10.80	.00	.00	.00	.00
15	1	0	0	.26300+001	190.0	.0	.0	22.50	11.60	10.80	.00	.00	.00	.00
16	0	0	0	.50000+001	201.0	.0	.0	50.00	340.00	8.00	1.00	25.00	90.00	50.00

FIGURE C-2. (continued)

```
*** --  HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION  -- ***

                    *** SOURCE PARTICULATE DATA ***


*** SOURCE NUMBER =     1 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =     2 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =     3 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,
```

FIGURE C-2. (continued)

```
*** --  HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION  -- ***

                    *** SOURCE PARTICULATE DATA ***


*** SOURCE NUMBER =     4 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =     5 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =     6 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,
```

FIGURE C-2. (continued)

```
*** --  HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION  -- ***

                    *** SOURCE PARTICULATE DATA ***


*** SOURCE NUMBER =      7 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =      8 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =      9 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,
```

FIGURE C-2. (continued)

```
*** --  HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION  -- ***

                    *** SOURCE PARTICULATE DATA ***


*** SOURCE NUMBER =    10 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =    11 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,
```

FIGURE C-2. (continued)

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* SOURCE EMISSION RATE SCALARS WHICH VARY FOR EACH HOUR OF THE DAY *

HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR
SOURCE NO. = 1											
1	.10000+001	2	.10000+001	3	.10000+001	4	.10000+001	5	.10000+001	6	.10000+001
7	.10000+001	8	.50000+001	9	.50000+001	10	.50000+001	11	.50000+001	12	.50000+001
13	.50000+001	14	.50000+001	15	.50000+001	16	.10000+001	17	.10000+001	18	.10000+001
19	.10000+001	20	.10000+001	21	.10000+001	22	.10000+001	23	.10000+001	24	.10000+001

FIGURE C-3. Listing of one day of hourly meteorological data used for the hypothetical potash processing plant concentration run.

MET. DATA
DAY 51

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* METEOROLOGICAL DATA FOR DAY 51 *

HOUR	FLOW VECTOR (DEGREES)	RANDOM FLOW VECTOR (DEGREES)	WIND SPEED (MPS)	MIXING HEIGHT (METERS)	TEMP. (DEG. K)	INPUT STABILITY CATEGORY	ADJUSTED STABILITY CATEGORY
1	160.0	158.0	5.14	761.2	261.5	4	4
2	160.0	163.0	3.60	764.2	260.4	5	5
3	150.0	154.0	3.60	767.2	259.8	5	5
4	150.0	151.0	4.63	770.2	258.7	5	5
5	150.0	148.0	5.66	773.1	258.1	4	4
6	140.0	143.0	6.17	776.1	257.6	4	4
7	150.0	152.0	6.17	779.1	257.0	4	4
8	150.0	155.0	5.66	782.1	257.0	4	4
9	160.0	162.0	4.63	785.1	256.5	3	3
10	160.0	157.0	5.14	788.1	258.7	4	4
11	170.0	173.0	5.14	791.0	260.9	4	4
12	160.0	162.0	6.17	794.0	262.6	4	4
13	150.0	148.0	4.63	797.0	263.7	3	3
14	160.0	160.0	6.69	800.0	264.8	4	4
15	150.0	154.0	6.17	800.0	264.8	4	4
16	150.0	146.0	6.69	800.0	265.4	4	4
17	160.0	158.0	6.17	800.0	264.8	4	4
18	160.0	157.0	4.12	802.9	263.1	5	5
19	160.0	165.0	3.60	809.5	262.0	5	5
20	160.0	161.0	4.63	816.1	260.9	5	5
21	160.0	165.0	5.14	822.7	259.8	5	5
22	160.0	156.0	3.60	829.3	259.3	5	5
23	150.0	146.0	4.12	835.9	258.7	5	5
24	160.0	160.0	5.66	842.5	258.1	4	4

FIGURE C-4. Listing of the diagnostic message table produced by the hypothetical potash processing plant concentration run.

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* SOURCE-RECEPTOR COMBINATIONS LESS THAN 001 METERS OR THREE BUILDING HEIGHTS IN DISTANCE. NO AVERAGE CONCENTRATION IS CALCULATED *

SOURCE NUMBER	- - RECEPTOR LOCATION - - X OR RANGE (METERS)	Y (METERS) OR DIRECTION (DEGREES)	DISTANCE BETWEEN (METERS)
1	.0	.0	-15.01
15	200.0	.0	-13.22
16	200.0	.0	1.00

FIGURE C-5. Listing of the table of 24-hour average concentration values computed on day 51 from Sources 12 to 15 by the hypothetical potash processing plant concentration run.

DAILY: 51
24-HR/PD 1
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 51 *
* FROM SOURCES: 12, -15,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 211.57320 AND OCCURRED AT (200.0, -200.0) *

Y-AXIS / (METERS) /	X-AXIS (METERS) -3000.0	-2000.0	-1500.0	-1250.0	-1000.0	-800.0	-600.0	-400.0	-200.0
3000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
2000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1500.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1250.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
800.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
600.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
400.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
200.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-200.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-400.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-600.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-800.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-1000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-1250.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-1500.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00001
-2000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00017
-3000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00001	.00144

FIGURE C-5. (continued)

DAILY: 51
24-HR/PD 1
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 51 *
* FROM SOURCES: 12, -15,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 211.57320 AND OCCURRED AT (200.0, -200.0) *

Y-AXIS / (METERS) /	X-AXIS (METERS) .0	200.0	400.0	600.0	800.0	1000.0	1250.0	1500.0	2000.0
3000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
2000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1500.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1250.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
800.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
600.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
400.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
200.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-200.0 /	.00000	211.57320	5.08344	.00009	.00000	.00000	.00000	.00000	.00000
-400.0 /	.00017	40.91343	129.94168	2.01586	.00189	.00000	.00000	.00000	.00000
-600.0 /	.00225	13.26752	146.76246	40.94308	1.11987	.00598	.00001	.00000	.00000
-800.0 /	.00779	7.13839	90.19569	73.74287	16.77151	.71139	.00348	.00002	.00000
-1000.0 /	.01547	4.54630	46.60481	83.06282	36.20046	7.91083	.21393	.00218	.00000
-1250.0 /	.02530	2.88374	18.57100	61.05610	50.14821	23.30838	3.69604	.16608	.00007
-1500.0 /	.03343	1.96899	8.47299	41.08075	50.99602	30.24997	13.27117	2.00615	.00469
-2000.0 /	.04291	1.06206	3.54489	13.79556	30.84629	34.87407	21.82375	12.41379	.79199
-3000.0 /	.04476	.44064	1.45587	2.24696	6.53760	15.22239	18.41441	19.59296	8.39733

FIGURE C-5. (continued)

DAILY: 51
24-HR/PD 1
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 51 *
* FROM SOURCES: 12, -15,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 211.57320 AND OCCURRED AT (200.0, -200.0) *

Y-AXIS (METERS) /	3000.0
	X-AXIS (METERS)
3000.0 /	.00000
2000.0 /	.00000
1500.0 /	.00000
1250.0 /	.00000
1000.0 /	.00000
800.0 /	.00000
600.0 /	.00000
400.0 /	.00000
200.0 /	.00000
.0 /	.00000
-200.0 /	.00000
-400.0 /	.00000
-600.0 /	.00000
-800.0 /	.00000
-1000.0 /	.00000
-1250.0 /	.00000
-1500.0 /	.00000
-2000.0 /	.00003
-3000.0 /	.23269

FIGURE C-5. (continued)

DAILY: 51
24-HR/PD 1
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 51 *
* FROM SOURCES: 12, -15,
* FOR THE DISCRETE RECEPTOR POINTS *

- RNG -	- DIR -	CON.	- RNG -	- DIR -	CON.	- RNG -	- DIR -	CON.
555.0	317.0	.00000	620.0	318.0	.00000	685.0	320.0	.00000
735.0	322.0	.00000	800.0	326.0	.00000	860.0	331.0	.00000
900.0	336.0	.00000	920.0	341.0	.00000	940.0	346.0	.00000
940.0	351.0	.00000	935.0	356.0	.00000	910.0	1.0	.00000
950.0	6.0	.00000	1015.0	11.0	.00000	1055.0	16.0	.00000
1075.0	21.0	.00000	1075.0	26.0	.00000	1045.0	31.0	.00000
995.0	36.0	.00000	910.0	41.0	.00000	855.0	43.0	.00000
755.0	45.0	.00000	620.0	47.0	.00000	525.0	49.0	.00000
460.0	51.0	.00000	355.0	56.0	.00000	355.0	66.0	.00000
355.0	76.0	.00000	355.0	86.0	.00000	350.0	96.0	.00007
345.0	106.0	.80927	335.0	116.0	64.76668	325.0	126.0	279.48573
380.0	136.0	268.55373	420.0	141.0	220.75506	450.0	146.0	149.28621
480.0	151.0	78.51823	505.0	156.0	30.88540	535.0	161.0	11.31163
575.0	166.0	3.81649	620.0	171.0	.77240	665.0	176.0	.06775
705.0	181.0	.00201	730.0	186.0	.00002	745.0	191.0	.00000
755.0	196.0	.00000	755.0	201.0	.00000	745.0	206.0	.00000
730.0	211.0	.00000	705.0	216.0	.00000	690.0	221.0	.00000
690.0	226.0	.00000	690.0	231.0	.00000	680.0	236.0	.00000
665.0	241.0	.00000	645.0	246.0	.00000	615.0	251.0	.00000
575.0	256.0	.00000	530.0	261.0	.00000	475.0	266.0	.00000
410.0	271.0	.00000	365.0	276.0	.00000	365.0	286.0	.00000
410.0	296.0	.00000						

FIGURE C-6. Listing of the table of the 1-day average concentration values computed from Sources 2 to 11 by the hypothetical potash processing plant.

'N'-DAY
1 DAYS
SGROUP# 2

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 1-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM SOURCES: 2, -11,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 59.65531 AND OCCURRED AT (200.0, -400.0) *

Y-AXIS / (METERS) /	X-AXIS (METERS) -3000.0	-2000.0	-1500.0	-1250.0	-1000.0	-800.0	-600.0	-400.0	-200.0
3000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
2000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1500.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1250.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
800.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
600.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
400.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
200.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-200.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-400.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00002
-600.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00006
-800.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00027
-1000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00001	.00084
-1250.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000		
-1500.0 /	.00000	.00000	.00000	.00000					
-2000.0 /	.00000	.00000							
-3000.0 /									

FIGURE C-6. (continued)

'N'-DAY
1 DAYS
SGROUP# 2

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 1-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM SOURCES: 2, -11,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 59.65531 AND OCCURRED AT (200.0, -400.0) *

Y-AXIS / (METERS) /	X-AXIS (METERS) .0	200.0	400.0	600.0	800.0	1000.0	1250.0	1500.0	2000.0
3000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
2000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1500.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1250.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
1000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
800.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
600.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
400.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
200.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
-200.0 /	.16369	49.39831	.00175	.00000	.00000	.00000	.00000	.00000	.00000
-400.0 /	.12443	59.65531	6.81886	.00738	.00000	.00000	.00000	.00000	.00000
-600.0 /	.09501	19.22733	22.29162	1.71592	.01037	.00003	.00000	.00000	.00000
-800.0 /	.07510	5.41674	22.40206	7.92875	.65617	.01115	.00004	.00000	.00000
-1000.0 /	.06125	2.01118	14.87403	10.93714	3.70798	.32736	.00411	.00003	.00000
-1250.0 /	.05019	.98807	8.23682	11.21170	5.63243	2.32460	.16850	.00438	.00000
-1500.0 /	.04175	.62678	3.74932	8.00290	7.26216	3.53813	1.10361	.09992	.00012
-2000.0 /	.03003	.31275	.81057	3.90889	5.05595	5.03393	2.50033	1.41317	.04512
-3000.0 /	.01744	.11117	.24047	.45082	1.60626	2.51844	2.71308	2.54611	1.05850

FIGURE C-6. (continued)

'N'-DAY
1 DAYS
SGROUP# 2

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 1-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM SOURCES: 2, -11,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 59.65531 AND OCCURRED AT (200.0, -400.0) *

Y-AXIS / (METERS) /	3000.0
	X-AXIS (METERS)
3000.0 /	.00000
2000.0 /	.00000
1500.0 /	.00000
1250.0 /	.00000
1000.0 /	.00000
800.0 /	.00000
600.0 /	.00000
400.0 /	.00000
200.0 /	.00000
.0 /	.00000
-200.0 /	.00000
-400.0 /	.00000
-600.0 /	.00000
-800.0 /	.00000
-1000.0 /	.00000
-1250.0 /	.00000
-1500.0 /	.00000
-2000.0 /	.00000
-3000.0 /	.01552

FIGURE C-6. (continued)

'N'-DAY
1 DAYS
SGROUP# 2

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 1-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM SOURCES: 2, -11,
* FOR THE DISCRETE RECEPTOR POINTS *

- RNG -	- DIR -	CON.	- RNG -	- DIR -	CON.	- RNG -	- DIR -	CON.
555.0	317.0	.00000	620.0	318.0	.00000	685.0	320.0	.00000
735.0	322.0	.00000	800.0	326.0	.00000	860.0	331.0	.00000
900.0	336.0	.00000	920.0	341.0	.00000	940.0	346.0	.00000
940.0	351.0	.00000	935.0	356.0	.00000	910.0	1.0	.00000
950.0	6.0	.00000	1015.0	11.0	.00000	1055.0	16.0	.00000
1075.0	21.0	.00000	1075.0	26.0	.00000	1045.0	31.0	.00000
995.0	36.0	.00000	910.0	41.0	.00000	855.0	43.0	.00000
755.0	45.0	.00000	620.0	47.0	.00000	525.0	49.0	.00000
460.0	51.0	.00000	355.0	56.0	.00000	355.0	66.0	.00000
355.0	76.0	.00000	355.0	86.0	.00000	350.0	96.0	.00000
345.0	106.0	.00000	335.0	116.0	.02385	325.0	126.0	4.26651
380.0	136.0	27.07583	420.0	141.0	42.16629	450.0	146.0	55.55005
480.0	151.0	58.16101	505.0	156.0	45.15536	535.0	161.0	24.13749
575.0	166.0	7.41905	620.0	171.0	2.06220	665.0	176.0	.51632
705.0	181.0	.04733	730.0	186.0	.00114	745.0	191.0	.00001
755.0	196.0	.00000	755.0	201.0	.00000	745.0	206.0	.00000
730.0	211.0	.00000	705.0	216.0	.00000	690.0	221.0	.00000
690.0	226.0	.00000	690.0	231.0	.00000	680.0	236.0	.00000
665.0	241.0	.00000	645.0	246.0	.00000	615.0	251.0	.00000
575.0	256.0	.00000	530.0	261.0	.00000	475.0	266.0	.00000
410.0	271.0	.00000	365.0	276.0	.00000	365.0	286.0	.00000
410.0	296.0	.00000						

FIGURE C-7. Listing of the table of the highest average concentration values computed at each receptor from Source 1 by the hypothetical potash processing plant concentration run.

HIGH
24-HR
SGROUP# 1

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM SOURCES: 1,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 7299.68060 AND OCCURRED AT (200.0, -400.0) *

Y-AXIS / (METERS) /	X-AXIS (METERS) -3000.0	-2000.0	-1500.0	-1250.0	-1000.0
3000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
2000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1500.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1250.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
800.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
600.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
400.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
200.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
-200.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
-400.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
-600.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
-800.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
-1000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (51, 1)
-1250.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (51, 1)	.00000 (51, 1)
-1500.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (51, 1)	.00000 (51, 1)
-2000.0 /	.00000 (0, 0)	.00000 (51, 1)	.00000 (51, 1)		
-3000.0 /	.00000 (0, 0)				

FIGURE C-7. (continued)

HIGH
24-HR
SGROUP# 1

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM SOURCES: 1,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 7299.68060 AND OCCURRED AT (200.0, -400.0) *

Y-AXIS / (METERS) /	X-AXIS (METERS) -800.0	-600.0	-400.0	-200.0	.0
3000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
2000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1500.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1250.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
800.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
600.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
400.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
200.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
-200.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	1312.08510 (51, 1)
-400.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (51, 1)	445.53158 (51, 1)
-600.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (51, 1)	.00000 (51, 1)	213.74151 (51, 1)
-800.0 /	.00000 (0, 0)	.00000 (51, 1)	.00000 (51, 1)	.00015 (51, 1)	123.78426 (51, 1)
-1000.0 /	.00000 (0, 0)	.00000 (51, 1)	.00000 (51, 1)	.00312 (51, 1)	80.22895 (51, 1)
-1250.0 /	.00000 (51, 1)	.00000 (51, 1)	.00000 (51, 1)	.02560 (51, 1)	53.40435 (51, 1)
-1500.0 /	.00000 (51, 1)	.00000 (51, 1)	.00000 (51, 1)	.08423 (51, 1)	38.13016 (51, 1)
-2000.0 /	.00000 (51, 1)	.00000 (51, 1)	.00023 (51, 1)	.27959 (51, 1)	22.23024 (51, 1)
-3000.0 /	.00000 (51, 1)	.00004 (51, 1)	.00989 (51, 1)	.60741 (51, 1)	10.21603 (51, 1)

FIGURE C-7. (continued)

HIGH
24-HR
SGROUP# 1

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM SOURCES: 1,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 7299.68060 AND OCCURRED AT (200.0, -400.0) *

Y-AXIS / (METERS) /	X-AXIS (METERS) 200.0	400.0	600.0	800.0	1000.0
3000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
2000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1500.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1250.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
800.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
600.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
400.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
200.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
-200.0 /	307.17259 (51, 1)	.00019 (51, 1)	.00000 (51, 1)	.00000 (51, 1)	.00000 (51, 1)
-400.0 /	7299.68060 (51, 1)	75.55939 (51, 1)	.03632 (51, 1)	.00001 (51, 1)	.00000 (51, 1)
-600.0 /	4195.57324 (51, 1)	1210.95787 (51, 1)	31.97048 (51, 1)	.15902 (51, 1)	.00053 (51, 1)
-800.0 /	1543.19011 (51, 1)	2395.10941 (51, 1)	399.74551 (51, 1)	17.24761 (51, 1)	.28272 (51, 1)
-1000.0 /	602.26014 (51, 1)	2078.45731 (51, 1)	773.98994 (51, 1)	162.50559 (51, 1)	10.69934 (51, 1)
-1250.0 /	327.54845 (51, 1)	1196.73634 (51, 1)	1293.01962 (51, 1)	406.83203 (51, 1)	109.67670 (51, 1)
-1500.0 /	236.40061 (51, 1)	638.11221 (51, 1)	1084.91165 (51, 1)	675.81922 (51, 1)	256.72968 (51, 1)
-2000.0 /	134.51301 (51, 1)	178.64470 (51, 1)	507.92512 (51, 1)	680.26542 (51, 1)	539.92424 (51, 1)
-3000.0 /	49.74825 (51, 1)	77.55591 (51, 1)	86.98523 (51, 1)	202.83957 (51, 1)	300.43374 (51, 1)

FIGURE C-7. (continued)

HIGH
24-HR
SGROUP# 1

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM SOURCES: 1,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 7299.68060 AND OCCURRED AT (200.0, -400.0) *

Y-AXIS / (METERS) /	X-AXIS (METERS) 1250.0	1500.0	2000.0	3000.0
3000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
2000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1500.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1250.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
1000.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
800.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
600.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
400.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
200.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
.0 /	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
-200.0 /	.00000 (51, 1)	.00000 (0, 0)	.00000 (0, 0)	.00000 (0, 0)
-400.0 /	.00000 (51, 1)	.00000 (51, 1)	.00000 (51, 1)	.00000 (0, 0)
-600.0 /	.00000 (51, 1)	.00000 (51, 1)	.00000 (51, 1)	.00000 (51, 1)
-800.0 /	.00112 (51, 1)	.00000 (51, 1)	.00000 (51, 1)	.00000 (51, 1)
-1000.0 /	.14874 (51, 1)	.00155 (51, 1)	.00000 (51, 1)	.00000 (51, 1)
-1250.0 /	6.59717 (51, 1)	.19390 (51, 1)	.00010 (51, 1)	.00000 (51, 1)
-1500.0 /	52.19542 (51, 1)	4.42344 (51, 1)	.00887 (51, 1)	.00000 (51, 1)
-2000.0 /	199.56811 (51, 1)	84.66451 (51, 1)	2.33336 (51, 1)	.00010 (51, 1)
-3000.0 /	359.34361 (51, 1)	279.02789 (51, 1)	80.32959 (51, 1)	.93480 (51, 1)

FIGURE C-7. (continued)

HIGH
24-HR
SGROUP# 1

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM SOURCES: 1,
* FOR THE DISCRETE RECEPTOR POINTS *

- RNG -	- DIR -	CON.	(DAY,PER.)	- RNG -	- DIR -	CON.	(DAY,PER.)
555.0	317.0	.00000	(0, 0)	620.0	318.0	.00000	(0, 0)
685.0	320.0	.00000	(0, 0)	735.0	322.0	.00000	(0, 0)
800.0	326.0	.00000	(0, 0)	860.0	331.0	.00000	(0, 0)
900.0	336.0	.00000	(0, 0)	920.0	341.0	.00000	(0, 0)
940.0	346.0	.00000	(0, 0)	940.0	351.0	.00000	(0, 0)
935.0	356.0	.00000	(0, 0)	910.0	1.0	.00000	(0, 0)
950.0	6.0	.00000	(0, 0)	1015.0	11.0	.00000	(0, 0)
1055.0	16.0	.00000	(0, 0)	1075.0	21.0	.00000	(0, 0)
1075.0	26.0	.00000	(0, 0)	1045.0	31.0	.00000	(0, 0)
995.0	36.0	.00000	(0, 0)	910.0	41.0	.00000	(0, 0)
855.0	43.0	.00000	(0, 0)	755.0	45.0	.00000	(0, 0)
620.0	47.0	.00000	(0, 0)	525.0	49.0	.00000	(0, 0)
460.0	51.0	.00000	(0, 0)	355.0	56.0	.00000	(0, 0)
355.0	66.0	.00000	(0, 0)	355.0	76.0	.00000	(0, 0)
355.0	86.0	.00000	(0, 0)	350.0	96.0	.00000	(51, 1)
345.0	106.0	.00000	(51, 1)	335.0	116.0	.00033	(51, 1)
325.0	126.0	2.18693	(51, 1)	380.0	136.0	252.87015	(51, 1)
420.0	141.0	1051.16232	(51, 1)	450.0	146.0	2513.70938	(51, 1)
480.0	151.0	4777.69031	(51, 1)	505.0	156.0	7180.53308	(51, 1)
535.0	161.0	5699.72913	(51, 1)	575.0	166.0	2798.85541	(51, 1)
620.0	171.0	1114.90518	(51, 1)	665.0	176.0	617.94398	(51, 1)
705.0	181.0	98.12818	(51, 1)	730.0	186.0	3.03500	(51, 1)
745.0	191.0	.01474	(51, 1)	755.0	196.0	.00001	(51, 1)
755.0	201.0	.00000	(51, 1)	745.0	206.0	.00000	(51, 1)
730.0	211.0	.00000	(51, 1)	705.0	216.0	.00000	(51, 1)
690.0	221.0	.00000	(0, 0)	690.0	226.0	.00000	(0, 0)
690.0	231.0	.00000	(0, 0)	680.0	236.0	.00000	(0, 0)
665.0	241.0	.00000	(0, 0)	645.0	246.0	.00000	(0, 0)
615.0	251.0	.00000	(0, 0)	575.0	256.0	.00000	(0, 0)
530.0	261.0	.00000	(0, 0)	475.0	266.0	.00000	(0, 0)
410.0	271.0	.00000	(0, 0)	365.0	276.0	.00000	(0, 0)
365.0	286.0	.00000	(0, 0)	410.0	296.0	.00000	(0, 0)

FIGURE C-8. Listing of the table of the maximum 50 average concentration values computed from Sources 12 to 15 by the hypothetical potash processing plant concentration run.

MAX 50
24-HR
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 50 MAXIMUM 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM SOURCES: 12, -15,

RANK	CON.	PER.	DAY	X OR RANGE (METERS)	Y(METERS) OR DIRECTION (DEGREES)	RANK	CON.	PER.	DAY	X OR RANGE (METERS)	Y(METERS) OR DIRECTION (DEGREES)
1	279.48573	1	51	325.0	126.0	26	21.82375	1	51	1250.0	-2000.0
2	268.55373	1	51	380.0	136.0	27	19.59296	1	51	1500.0	-3000.0
3	220.75506	1	51	420.0	141.0	28	18.57100	1	51	400.0	-1250.0
4	211.57320	1	51	200.0	-200.0	29	18.41441	1	51	1250.0	-3000.0
5	149.28621	1	51	450.0	146.0	30	16.77151	1	51	800.0	-800.0
6	146.76246	1	51	400.0	-600.0	31	15.22239	1	51	1000.0	-3000.0
7	129.94168	1	51	400.0	-400.0	32	13.79556	1	51	600.0	-2000.0
8	90.19569	1	51	400.0	-800.0	33	13.27117	1	51	1250.0	-1500.0
9	83.06282	1	51	600.0	-1000.0	34	13.26752	1	51	200.0	-600.0
10	78.51823	1	51	430.0	151.0	35	12.41379	1	51	1500.0	-2000.0
11	73.74287	1	51	600.0	-800.0	36	11.31163	1	51	535.0	161.0
12	64.76668	1	51	335.0	116.0	37	8.47299	1	51	400.0	-1500.0
13	61.05610	1	51	600.0	-1250.0	38	8.39733	1	51	2000.0	-3000.0
14	50.99602	1	51	800.0	-1500.0	39	7.91083	1	51	1000.0	-1000.0
15	50.14821	1	51	800.0	-1250.0	40	7.13839	1	51	200.0	-800.0
16	46.60481	1	51	400.0	-1000.0	41	6.53760	1	51	800.0	-3000.0
17	41.08075	1	51	600.0	-1500.0	42	5.08344	1	51	400.0	-200.0
18	40.94308	1	51	600.0	-600.0	43	4.54630	1	51	200.0	-1000.0
19	40.91343	1	51	200.0	-400.0	44	3.81649	1	51	575.0	166.0
20	36.20046	1	51	800.0	-1000.0	45	3.69604	1	51	1250.0	-1250.0
21	34.87407	1	51	1000.0	-2000.0	46	3.54489	1	51	400.0	-2000.0
22	30.88540	1	51	505.0	156.0	47	2.88374	1	51	200.0	-1250.0
23	30.84629	1	51	800.0	-2000.0	48	2.24696	1	51	600.0	-3000.0
24	30.24997	1	51	1000.0	-1500.0	49	2.01586	1	51	600.0	-400.0
25	23.30838	1	51	1000.0	-1250.0	50	2.00615	1	51	1500.0	-1500.0

Figure C-6. The format of this table is similar to the tables produced by the ISW(16) option mentioned above. Figure C-7 shows the content and format of a highest concentration table produced by the ISW(17) option. The content includes the highest average concentration values calculated for all receptors as well as the day and time period when each value occurred. In this case, only one averaging period is possible per day and a "1" is printed for the averaging period. The second-highest table (not shown) is identical in format to the highest concentration table. Option ISW(18) generates the maximum 50 tables, an example of which is shown in Figure C-8.

C.3 Example Dry Deposition Run

Because the preparation of a total deposition run is very similar to the preparation of the average concentration run discussed in the preceding section, only the differences between the two runs are discussed in this section. The primary difference between the two runs is that the deposition model requires all sources to have gravitational settling categories (parameter NVS > 0). If the program detects any sources which do not have any gravitational settling categories, the program prints the error message shown in Figure 3-2(d) and terminates the run. As mentioned in Section 2.6, it is desired to obtain an estimate of the dry deposition of fugitive emissions from the ore pile (Source 1) and the conveyor belt (Sources 2-11). Hence, this example run excludes the roof monitor (Sources 12-15) and the stack (Source 16) which were modeled for concentration in the preceding section.

Figure C-9 shows the 130 lines of card input data values required to compute the desired total deposition values for the hypothetical potash processing plant. Three differences between this deposition run and the concentration run are noted in Card Group 2, which consists of the second and the third lines of Figure C-9 according to Table 3-4. One difference is that

CARD GROUP	CARD NUMBER	CARD COLUMN
		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
1	1	-- HYPOTHETICAL POTASH PROCESSING PLANT -
2	2	2 1 2 0 0 2 1 1 1 1 1 1 0 1 1 0 2 1 2 2 2 2 2
	3	11 19 19 64 3
3	4	-3000 -2000 -1500 -1250 -1000 -800 -600 -400
	5	-200 0 200 400 600 800 1000 1250
	6	1500 2000 3000
	7	-3000 -2000 -1500 -1250 -1000 -800 -600 -400
	8	-200 0 200 400 600 800 1000 1250
	9	1500 2000 3000
	10	555.0 317.0
	11	620.0 318.0
	12	685.0 320.0
	13	735.0 322.0
	14	800.0 326.0
	15	860.0 331.0
	16	900.0 336.0
	17	920.0 341.0
	18	940.0 346.0
	19	940.0 351.0
	20	935.0 356.0
	21	910.0 1.0
	22	950.0 6.0
	23	1015.0 11.0
	24	1055.0 16.0
	25	1075.0 21.0
	26	1075.0 26.0
	27	1045.0 31.0
	28	995.0 36.0
	29	910.0 41.0
	30	855.0 43.0
	31	755.0 45.0
	32	620.0 47.0
	33	525.0 49.0
	34	460.0 51.0
	35	355.0 56.0
	36	355.0 66.0
	37	355.0 76.0
	38	355.0 86.0
	39	350.0 96.0
	40	345.0 106.0
	41	335.0 116.0
	42	325.0 126.0
	43	380.0 136.0
	44	420.0 141.0
	45	450.0 146.0
	46	480.0 151.0
	47	505.0 156.0
	48	535.0 161.0
	49	575.0 166.0

Figure C-9. Card input data values for the hypothetical potash processing plant deposition run.

CARD GROUP	CARD NUMBER	CARD COLUMN
	50	620.0 171.0
	51	665.0 176.0
	52	705.0 181.0
	53	730.0 186.0
	54	745.0 191.0
	55	755.0 196.0
	56	755.0 201.0
	57	745.0 206.0
	58	730.0 211.0
	59	705.0 216.0
	60	690.0 221.0
	61	690.0 226.0
	62	690.0 231.0
	63	680.0 236.0
	64	665.0 241.0
	65	645.0 246.0
	66	615.0 251.0
	67	575.0 256.0
	68	530.0 261.0
	69	475.0 266.0
	70	410.0 271.0
	71	365.0 276.0
	72	365.0 286.0
	73	410.0 296.0
4	74	1 2 2
	75	1 2 -11 1 -11
5	76	
	77	
	78	1
	79	
	80	
	81	
	82	
	83	14913 64 14918 64
6	84	12 63 360. -13.3 -13.3 0 10.0 26.6
	85	.1 .4 .28 .12 .06 .04
	86	.001 .007 .019 .037 .061 .099
	87	1.0 .82 .72 .65 .59 .5
	88	21 60 468. 20 0 0 .9 1 4.7
	89	.1 .4 .28 .12 .06 .04
	90	.001 .007 .019 .037 .061 .099
	91	1.0 .82 .72 .65 .59 .5
	92	31 60 468. 30 0 0 2.6 1 4.7
	93	.1 .4 .28 .12 .06 .04
	94	.001 .007 .019 .037 .061 .099
	95	1.0 .82 .72 .65 .59 .5
	96	41 60 468. 40 0 0 4.3 1 4.7
	97	.1 .4 .28 .12 .06 .04
	98	.001 .007 .019 .037 .061 .099

Figure C-9. (Continued)

CARD GROUP	CARD NUMBER	CARD COLUMN																	
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80		
	99		1.0		.82		.72		.65		.59		.5						
	100	51	60	468.		49		0	0	6.1	1	4.7							
	101		.1		.4		.28		.12		.06		.04						
	102		.001		.007		.019		.037		.061		.099						
	103		1.0		.82		.72		.65		.59		.5						
	104	61	60	468.		59		0	0	7.8	1	4.7							
	105		.1		.4		.28		.12		.06		.04						
	106		.001		.007		.019		.037		.061		.099						
	107		1.0		.82		.72		.65		.59		.5						
	108	71	60	468.		69		0	0	9.6	1	4.7							
	109		.1		.4		.28		.12		.06		.04						
	110		.001		.007		.019		.037		.061		.099						
	111		1.0		.82		.72		.65		.59		.5						
	112	81	60	468.		79		0	0	11.3	1	4.7							
	113		.1		.4		.28		.12		.06		.04						
	114		.001		.007		.019		.037		.061		.099						
	115		1.0		.82		.72		.65		.59		.5						
	116	91	60	468.		89		0	0	13.0	1	4.7							
	117		.1		.4		.28		.12		.06		.04						
	118		.001		.007		.019		.037		.061		.099						
	119		1.0		.82		.72		.65		.59		.5						
	120	101	60	468.		99		0	0	14.8	1	4.7							
	121		.1		.4		.28		.12		.06		.04						
	122		.001		.007		.019		.037		.061		.099						
	123		1.0		.82		.72		.65		.59		.5						
	124	111	60	468.		109		0	0	16.5	1	4.7							
	125		.1		.4		.28		.12		.06		.04						
	126		.001		.007		.019		.037		.061		.099						
	127		1.0		.82		.72		.65		.59		.5						
	128		1		1		1		1		1		1		1		5		
	129		5		5		5		5		5		5		5		1		
	130		1		1		1		1		1		1		1		1		

Figure C-9. (Continued)

ISW(1) equals "2" to indicate to the program to compute deposition. The second difference is that NSOURC equals "11" since the roof monitor (Sources 12-15) and the stack (Source 16) are not modeled for deposition. Third, because of the fewer number of sources, there are fewer source groups; hence, NGROUP equals "3." Furthermore, Card Group 4 is different because of fewer source groups. As indicated by the values contained in Card Group 4 shown in Figure C-9, it is desired to see the total deposition contributions from the ore pile (Source 1), the conveyor belt (Sources 2-11) and both the ore pile and conveyor belt. A preliminary estimate of the magnitude of the total deposition values indicated that the desired output units be in grams per square meter, the program's default units for deposition calculations. Because there are only 11 sources in this example, Card Group 6 contains source data values for 11 sources instead of the 16 sources used in the example concentration run. Note that the total hourly emissions in grams for the eleven sources are a factor of 3600 times larger than the average emission rates in grams per second used to compute average concentration (refer to Section 2.4.3 for an explanation of emission rates for deposition calculations).

Only the "50 maximum" table (Figure C-10) of the print output produced by this deposition example run is shown because the format of the output tables are the same as those of the concentration example run discussed in the preceding section. The only exceptions are in the heading where the words "AVERAGE CONCENTRATION" are replaced by "TOTAL DEPOSITION" and the output units are (GRAMS/SQUARE METER) instead of (MICROGRAMS/CUBIC METER).

FIGURE C-10. Listing of the table of the maximum 50 average concentration values computed from Sources 1 to 11 by the hypothetical potash processing plant concentration run.

MAX 50
24-HR
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 50 MAXIMUM 24-HOUR TOTAL DEPOSITION (GRAMS/SQUARE METER *

* FROM SOURCES: 1, -11,

RANK	DEP.	PER.	DAY	X OR RANGE (METERS)	Y(METERS) OR DIRECTION (DEGREES)	RANK	DEP.	PER.	DAY	X OR RANGE (METERS)	Y(METERS) OR DIRECTION (DEGREES)
1	18.44659	1	51	200.0	-400.0	26	.45011	1	51	600.0	-800.0
2	16.09612	1	51	505.0	156.0	27	.40013	1	51	800.0	-2000.0
3	12.20186	1	51	535.0	161.0	28	.39935	1	51	.0	-600.0
4	11.30931	1	51	480.0	151.0	29	.31662	1	51	800.0	-1250.0
5	7.88501	1	51	.0	-200.0	30	.30122	1	51	1000.0	-2000.0
6	7.56966	1	51	200.0	-600.0	31	.29673	1	51	600.0	-2000.0
7	6.33068	1	51	450.0	146.0	32	.29087	1	51	200.0	-1250.0
8	5.29350	1	51	575.0	166.0	33	.18140	1	51	200.0	-1500.0
9	3.03669	1	51	400.0	-800.0	34	.17501	1	51	.0	-800.0
10	2.93984	1	51	420.0	141.0	35	.16870	1	51	1000.0	-1500.0
11	2.19844	1	51	400.0	-1000.0	36	.16698	1	51	400.0	-400.0
12	2.03710	1	51	200.0	-800.0	37	.15712	1	51	705.0	181.0
13	1.98672	1	51	620.0	171.0	38	.15549	1	51	1250.0	-3000.0
14	1.89310	1	51	400.0	-600.0	39	.14997	1	51	800.0	-1000.0
15	1.43739	1	51	200.0	-200.0	40	.13255	1	51	1000.0	-3000.0
16	1.25203	1	51	.0	-400.0	41	.11608	1	51	1500.0	-3000.0
17	1.07066	1	51	600.0	-1250.0	42	.10678	1	51	1250.0	-2000.0
18	1.04983	1	51	400.0	-1250.0	43	.10375	1	51	400.0	-2000.0
19	1.03835	1	51	665.0	176.0	44	.08902	1	51	.0	-1000.0
20	.83924	1	51	380.0	136.0	45	.08503	1	51	800.0	-3000.0
21	.80653	1	51	600.0	-1500.0	46	.08327	1	51	1000.0	-1250.0
22	.75775	1	51	600.0	-1000.0	47	.08205	1	51	200.0	-2000.0
23	.63566	1	51	200.0	-1000.0	48	.04869	1	51	.0	-1250.0
24	.47381	1	51	800.0	-1500.0	49	.04645	1	51	600.0	-600.0
25	.46416	1	51	400.0	-1500.0	50	.04327	1	51	1500.0	-2000.0

APPENDIX D

EXAMPLE EXECUTIONS OF THE ISC LONG-TERM MODEL (ISCLT) COMPUTER PROGRAM

D.1 Introduction

The following examples are problem runs using the ISC long-term (ISCLT) program to model the hypothetical potash processing plant described in Section 2.6. The examples consist of two executions of the ISCLT program. The first problem is to calculate annual average ground-level particulate concentrations and the second problem is to calculate total annual ground-level deposition. This appendix assumes the user is familiar with the example hypothetical processing plant discussed in Section 2.6 of the main body of the text.

D.2 Example Concentration Run

This program example run calculates the annual average ground-level particulate concentrations produced by emissions from the hypothetical potash processing plant described in Section 2.6 and shown in Figure 2-11. The hypothetical plant is modeled as 16 sources: one stack source, fourteen volume sources (roof monitor and conveyor belt) and one area source (ore pile). These sources are placed at the approximate center of the receptor grid system. Because we are only interested in the annual average ground-level particulate concentrations produced by these sources, annual meteorological data are used. The annual meteorological inputs as well as required program control data are explained in Section D.2.1 and D.2.2.

D.2.1 Input Data Set-Up Procedure

This example run requires the input data shown in the example runstream in Figure D-1. An explanation of each card group in Figure D-1 is given in Sections D.2.1.a. through D.2.1.m. below.

CARD GROUP	CARD NUMBER	CARD COLUMN
		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
1	1	HYPOTHETICAL POTASH PROCESSING PLANT
2	2	1 2 1 3 2 3 3 2 2 1 1 1 1 1
3	3	16 5 19 19 1
4	4	1 2 2 1 1
4a	5	1 2 -11 12 -15 16 -16
5	6	
6	7	-3000 -2000 -1500 -1250 -1000 -800 -600 -400
	8	-200 0 200 400 600 800 1000 1250
	9	1500 2000 3000
7	10	-3000 -2000 -1500 -1250 -1000 -800 -600 -400
	11	-200 0 200 400 600 800 1000 1250
	12	1500 2000 3000
6a 7a	13	2108.0 14.0
9a	14	.0001695 .0000856 .0000000 .0000000 .0000000 .0000000
	15	.0001283 .0001998 .0000000 .0000000 .0000000 .0000000
	16	.0000918 .0001998 .0000000 .0000000 .0000000 .0000000
	17	.0001076 .0002569 .0000000 .0000000 .0000000 .0000000
	18	.0003119 .0005995 .0000000 .0000000 .0000000 .0000000
	19	.0003611 .0005139 .0000000 .0000000 .0000000 .0000000
	20	.0003865 .0003426 .0000000 .0000000 .0000000 .0000000
	21	.0006953 .0007993 .0000000 .0000000 .0000000 .0000000
	22	.0006747 .0008564 .0000000 .0000000 .0000000 .0000000
	23	.0005512 .0005424 .0000000 .0000000 .0000000 .0000000
	24	.0001441 .0002569 .0000000 .0000000 .0000000 .0000000
	25	.0001155 .0002855 .0000000 .0000000 .0000000 .0000000
	26	.0002899 .0002569 .0000000 .0000000 .0000000 .0000000
	27	.0000839 .0001713 .0000000 .0000000 .0000000 .0000000
	28	.0000602 .0000856 .0000000 .0000000 .0000000 .0000000
	29	.0002820 .0002284 .0000000 .0000000 .0000000 .0000000
	30	.0007353 .0007708 .0005710 .0000000 .0000000 .0000000
	31	.0010488 .0010848 .0004853 .0000000 .0000000 .0000000
	32	.0004444 .0006851 .0001998 .0000000 .0000000 .0000000
	33	.0009629 .0014845 .0008564 .0000000 .0000000 .0000000
	34	.0018775 .0027977 .0016843 .0000000 .0000000 .0000000
	35	.0016892 .0027977 .0027691 .0000000 .0000000 .0000000
	36	.0019770 .0031688 .0034257 .0000000 .0000000 .0000000
	37	.0026238 .0039967 .0042536 .0000000 .0000000 .0000000
	38	.0045918 .0042251 .0028548 .0000000 .0000000 .0000000
	39	.0026274 .0030832 .0010563 .0000000 .0000000 .0000000
	40	.0014567 .0010848 .0006281 .0000000 .0000000 .0000000
	41	.0016527 .0021125 .0007137 .0000000 .0000000 .0000000
	42	.0024999 .0021125 .0011134 .0000000 .0000000 .0000000
	43	.0013425 .0011990 .0007708 .0000000 .0000000 .0000000
	44	.0009151 .0006851 .0004568 .0000000 .0000000 .0000000
	45	.0007325 .0007422 .0003711 .0000000 .0000000 .0000000
	46	.0004645 .0009421 .0012561 .0001427 .0000285 .0000000
	47	.0006990 .0007993 .0015130 .0004853 .0001427 .0000285
	48	.0002668 .0007422 .0009421 .0004282 .0000285 .0000000
	49	.0005317 .0014559 .0015701 .0004282 .0000571 .0000000
	50	.0006882 .0027977 .0058523 .0007137 .0000856 .0000000

Figure D-1. Card input data values for the hypothetical potash processing plant concentration run.

CARD GROUP	CARD NUMBER	CARD COLUMN															
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
	51	.0006961	.0037683	.0069657	.0021125	.0001427	.0000000										
	52	.0005842	.0030546	.0075652	.0031688	.0001713	.0000000										
	53	.0006083	.0042536	.0081076	.0025978	.0001993	.0000000										
	54	.0011771	.0040823	.0051101	.0006281	.0001142	.0000285										
	55	.0007716	.0035399	.0024551	.0002569	.0001142	.0000856										
	56	.0006050	.0016272	.0020269	.0004568	.0000856	.0001427										
	57	.0008245	.0038539	.0028833	.0005139	.0001713	.0003426										
	58	.0014135	.0043964	.0059665	.0011134	.0002855	.0003426										
	59	.0008536	.0021125	.0033972	.0005139	.0002569	.0002284										
	60	.0003503	.0010563	.0013417	.0001713	.0000571	.0000285										
	61	.0006561	.0010563	.0009421	.0001142	.0000571	.0000000										
	62	.0009550	.0025978	.0079077	.0136744	.0112764	.0102772										
	63	.0006897	.0027406	.0088784	.0134745	.0080790	.0050530										
	64	.0003984	.0016843	.0065945	.0055383	.0020554	.0005424										
	65	.0008488	.0040823	.0036214	.0061663	.0011419	.0001993										
	66	.0019828	.0061949	.0149019	.0124754	.0019412	.0002284										
	67	.0013385	.0053384	.0166148	.0184133	.0032259	.0004853										
	68	.0007174	.0035399	.0090782	.0119044	.0017129	.0001998										
	69	.0009847	.0034257	.0065945	.0070228	.0011990	.0002569										
	70	.0010097	.0037683	.0046818	.0045105	.0012561	.0006281										
	71	.0005797	.0029119	.0021411	.0034257	.0013132	.0004853										
	72	.0004980	.0013703	.0022553	.0034543	.0019983	.0012561										
	73	.0005598	.0017985	.0050530	.0058808	.0028548	.0020840										
	74	.0012231	.0045962	.0091353	.0148448	.0079077	.0057667										
	75	.0006990	.0020269	.0074224	.0141597	.0104193	.0065945										
	76	.0005355	.0018842	.0051101	.0075937	.0029404	.0019412										
	77	.0007400	.0021696	.0065374	.0055954	.0026264	.0015987										
	78	.0000000	.0052528	.0095064	.0000000	.0000000	.0000000										
	79	.0000000	.0032544	.0076794	.0000000	.0000000	.0000000										
	80	.0000000	.0017700	.0057096	.0000000	.0000000	.0000000										
	81	.0000000	.0033686	.0075937	.0000000	.0000000	.0000000										
	82	.0000000	.0049673	.0097062	.0000000	.0000000	.0000000										
	83	.0000000	.0027406	.0056239	.0000000	.0000000	.0000000										
	84	.0000000	.0017700	.0027406	.0000000	.0000000	.0000000										
	85	.0000000	.0023695	.0018271	.0000000	.0000000	.0000000										
	86	.0000000	.0024551	.0015701	.0000000	.0000000	.0000000										
	87	.0000000	.0018271	.0013132	.0000000	.0000000	.0000000										
	88	.0000000	.0016558	.0019983	.0000000	.0000000	.0000000										
	89	.0000000	.0034257	.0055383	.0000000	.0000000	.0000000										
	90	.0000000	.0066802	.0111622	.0000000	.0000000	.0000000										
	91	.0000000	.0049959	.0070228	.0000000	.0000000	.0000000										
	92	.0000000	.0035685	.0063091	.0000000	.0000000	.0000000										
	93	.0000000	.0052242	.0089925	.0000000	.0000000	.0000000										
	94	.0066412	.0097348	.0000000	.0000000	.0000000	.0000000										
	95	.0037307	.0055954	.0000000	.0000000	.0000000	.0000000										
	96	.0024779	.0043107	.0000000	.0000000	.0000000	.0000000										
	97	.0028384	.0049388	.0000000	.0000000	.0000000	.0000000										
	98	.0047532	.0077364	.0000000	.0000000	.0000000	.0000000										
	99	.0030647	.0049102	.0000000	.0000000	.0000000	.0000000										
	100	.0032044	.0028262	.0000000	.0000000	.0000000	.0000000										
	101	.0035623	.0023695	.0000000	.0000000	.0000000	.0000000										
	102	.0047073	.0031688	.0000000	.0000000	.0000000	.0000000										
	103	.0048615	.0041680	.0000000	.0000000	.0000000	.0000000										
	104	.0029674	.0034257	.0000000	.0000000	.0000000	.0000000										
	105	.0059074	.0094493	.0000000	.0000000	.0000000	.0000000										
	106	.0117078	.0205544	.0000000	.0000000	.0000000	.0000000										
	107	.0074288	.0120472	.0000000	.0000000	.0000000	.0000000										

Figure D-1. (Continued)

CARD GROUP	CARD NUMBER	CARD COLUMN
		5 1 0 1 5 2 0 2 5 3 0 3 5 4 0 4 5 5 0 5 5 6 0 6 5 7 0 7 5 8 0
	108	.0062942 .0098204 .0000000 .0000000 .0000000 .0000000
	109	.0076137 .0128180 .0000000 .0000000 .0000000 .0000000
10	110	287.2 287.2 283.2 280.8 279.1 279.1
11	111	1730 1730
	112	1730 1730 1730
	113	960 1025 1235 1295 1295 1295
	114	320 500 840 840 840 840
	115	
	116	
12	117	
	118	
	119	
	120	
	121	
	122	
13	123	
14	124	
15	125	
	126	
16	127	
	128	
	129	
	130	
	131	
	132	
17	133	1 23 -13.3 -13.3 10 26.6 6
	134	.001 .007 .019 .037 .061 .099
	135	.10 .40 .28 .12 .06 .04
	136	1.0 .82 .72 .65 .59 .50
	137	.40 .50
	138	.30 .40 .50
	139	.20 .30 .40 .50 .70 1.0
	140	.10 .25 .50 .50 .70 1.0
	141	.20 .25
	142	.05 .10
	143	2 13 20 0 .9 4.7 1.0 6
	144	.001 .007 .019 .037 .061 .099
	145	.10 .40 .28 .12 .06 .04
	146	1.0 .82 .72 .65 .59 .50
	147	.13 .16
	148	.10 .13 .16
	149	.08 .12 .14 .16 .19 .22
	150	.04 .10 .13 .16 .19 .22
	151	.08 .10
	152	.02 .05
	153	3 13 30 0 2.6 4.7 1.0 6
	154	.001 .007 .019 .037 .061 .099
	155	.10 .40 .28 .12 .06 .04
	156	1.0 .82 .72 .65 .59 .50
	157	.13 .16
	158	.10 .13 .16
	159	.08 .12 .14 .16 .19 .22
	160	.04 .10 .13 .16 .19 .22
	161	.08 .10
	162	.02 .05
	163	4 13 40 0 4.3 4.7 1.0 6
	164	.001 .007 .019 .037 .061 .099

Figure D-1. (Continued)

CARD GROUP	CARD NUMBER	CARD COLUMN															
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
	165		.10		.40		.28		.12		.06		.04				
	166		1.0		.82		.72		.65		.59		.50				
	167		.13		.16												
	168		.10		.13		.16										
	169		.08		.12		.14		.16		.19		.22				
	170		.04		.10		.13		.16		.19		.22				
	171				.08		.10										
	172		.02		.05												
	173	5	13		49		0	6.1			4.7	1.0					6
	174		.001		.007		.019		.037		.061		.099				
	175		.10		.40		.28		.12		.06		.04				
	176		1.0		.82		.72		.65		.59		.50				
	177		.13		.16												
	178		.10		.13		.16										
	179		.08		.12		.14		.16		.19		.22				
	180		.04		.10		.13		.16		.19		.22				
	181				.08		.10										
	182		.02		.05												
	183	6	13		59		0	7.8			4.7	1.0					6
	184		.001		.007		.019		.037		.061		.099				
	185		.10		.40		.28		.12		.06		.04				
	186		1.0		.82		.72		.65		.59		.50				
	187		.13		.16												
	188		.10		.13		.16										
	189		.08		.12		.14		.16		.19		.22				
	190		.04		.10		.13		.16		.19		.22				
	191				.08		.10										
	192		.02		.05												
	193	7	13		69		0	9.6			4.7	1.0					6
	194		.001		.007		.019		.037		.061		.099				
	195		.10		.40		.28		.12		.06		.04				
	196		1.0		.82		.72		.65		.59		.50				
	197		.13		.16												
	198		.10		.13		.16										
	199		.08		.12		.14		.16		.19		.22				
	200		.04		.10		.13		.16		.19		.22				
	201				.08		.10										
	202		.02		.05												
	203	8	13		79		0	11.3			4.7	1.0					6
	204		.001		.007		.019		.037		.061		.099				
	205		.10		.40		.28		.12		.06		.04				
	206		1.0		.82		.72		.65		.59		.50				
	207		.13		.16												
	208		.10		.13		.16										
	209		.08		.12		.14		.16		.19		.22				
	210		.04		.10		.13		.16		.19		.22				
	211				.08		.10										
	212		.02		.05												
	213	9	13		89		0	13.0			4.7	1.0					6
	214		.001		.007		.019		.037		.061		.099				
	215		.10		.40		.28		.12		.06		.04				
	216		1.0		.82		.72		.65		.59		.50				
	217		.13		.16												
	218		.10		.13		.16										
	219		.08		.12		.14		.16		.19		.22				
	220		.04		.10		.13		.16		.19		.22				
	221				.08		.10										

Figure D-1. (Continued)

CARD GROUP	CARD NUMBER	CARD COLUMN
		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
	222	.02 .05
	223	10 13 99 0 14.8 4.7 1.0 6
	224	.001 .007 .019 .037 .061 .099
	225	.10 .40 .28 .12 .06 .04
	226	1.0 .82 .72 .65 .59 .50
	227	.13 .16
	228	.10 .13 .16
	229	.08 .12 .14 .16 .19 .22
	230	.04 .10 .13 .16 .19 .22
	231	.08 .10
	232	.02 .05
	233	11 13 109 0 16.5 4.7 1.0 6
	234	.001 .007 .019 .037 .061 .099
	235	.10 .40 .28 .12 .06 .04
	236	1.0 .82 .72 .65 .59 .50
	237	.13 .16
	238	.10 .13 .16
	239	.08 .12 .14 .16 .19 .22
	240	.04 .10 .13 .16 .19 .22
	241	.08 .10
	242	.02 .05
	243	12 10 121 0 22.5 10.8 11.6
	244	2.63
	245	13 10 144 0 22.5 10.8 11.6
	246	2.63
	247	14 10 167 0 22.5 10.8 11.6
	248	2.63
	249	15 10 190 0 22.5 10.8 11.6
	250	2.63
	251	16 00 201 30 50.0 340 8.0 1.0 25 67
	252	5

Figure D-1. (Continued)

a. Card Group 1. Card Group 1 gives the user selected title for the program run. This title is printed at the top of each output page as shown in Figure D-2.

b. Card Group 2. Card Group 2 selects the program control options desired. This card group shows: ISW(1) equal to "1" for concentration, ISW(3) equal to "2" for discrete receptors in polar coordinates, ISW(5) equal to "1" for an output magnetic tape, ISW(6) equal to "3" for a full printout of the input data, ISW(7) equal to "2" for annual output only, ISW(8) equal to "3" for printing individual as well as combined sources results, ISW(9) equal to "3" for the Rural Mode, ISW(10) equal to "2" for a printout of concentration at all receptors as well as the maximum 10 values, and ISW(11) equal to "2" directing the program to determine the maximum 10 from the combined sources. The receptor grid system used is in Cartesian coordinates; hence, ISW(2) is left blank. Also, ISW(4) is left blank because flat terrain is assumed for the area in the vicinity of the hypothetical potash plant. The parameter ISW(12) is left blank because we are using ISW(11) for the maximum 10 values and the parameters ISW(13) through ISW(18) are left blank because we are using the program default values for these parameters. ISW(13) directs the print output to logical unit 6, ISW(14) is blank because we are not using an input tape and ISW(15) directs the tape output to the magnetic tape on logical unit 3. The default value for ISW(16) directs the program to use the standard print output format rather than compress pages, ISW(17) directs the program to use 57 lines per page, and ISW(18) tells the program that Card Group 9 is not read in this run. ISW(19) directs the program to calculate plume rise as a function of downwind distance because the building wake effects option is to be used for the stack. ISW(21), ISW(22), ISW(23) and ISW(24) were all set to "1" indicating buoyancy induced dispersion was not

Figure D-2. Annual Average Ground-Level Particulate Concentration Output Listing.

```
**** ISCLT ***************                HYPOTHETICAL POTASH PROCESSING PLANT                ********* PAGE      1 ****

                                   - ISCLT INPUT DATA -

        NUMBER OF SOURCES =  16
        NUMBER OF X AXIS GRID SYSTEM POINTS =   19
        NUMBER OF Y AXIS GRID SYSTEM POINTS =   19
        NUMBER OF SPECIAL POINTS =    1
        NUMBER OF SEASONS =   1
        NUMBER OF WIND SPEED CLASSES =   6
        NUMBER OF STABILITY CLASSES =   6
        NUMBER OF WIND DIRECTION CLASSES =  16
        FILE NUMBER OF DATA FILE USED FOR REPORTS =   1
        THE PROGRAM IS RUN IN RURAL MODE
        CONCENTRATION (DEPOSITION) UNITS CONVERSION FACTOR = .10000000+007
        ACCELERATION OF GRAVITY (METERS/SEC**2) =  9.800
        HEIGHT OF MEASUREMENT OF WIND SPEED (METERS) =  10.000
        CORRECTION ANGLE FOR GRID SYSTEM VERSUS DIRECTION DATA NORTH (DEGREES) =    .000
        DECAY COEFFICIENT = .00000000
        PROGRAM OPTION SWITCHES = 1, 1, 2, 0, 1, 3, 2, 3, 3, 2, 2, 0, 0, 0, 0, 0, 0, 1, 0, 1, 1, 1, 1,
        SOURCES USED TO FORM SOURCE COMBINATION  1 ARE -     1,
        SOURCES USED TO FORM SOURCE COMBINATION  2 ARE -     2,   -11,
        SOURCES USED TO FORM SOURCE COMBINATION  3 ARE -    12,   -15,
        SOURCES USED TO FORM SOURCE COMBINATION  4 ARE -    16,
        SOURCES USED TO FORM SOURCE COMBINATION  5 ARE -   -16,
      DISTANCE X AXIS GRID SYSTEM POINTS (METERS )=   -3000.00,   -2000.00,   -1500.00,   -1250.00,   -1000.00,    -800.00,
          -600.00,    -400.00,    -200.00,        .00,     200.00,     400.00,     600.00,     800.00,    1000.00,    1250.00,
          1500.00,    2000.00,    3000.00,
        RANGE X SPECIAL DISCRETE POINTS (METERS )=    2108.00,
      DISTANCE Y AXIS GRID SYSTEM POINTS (METERS )=   -3000.00,   -2000.00,   -1500.00,   -1250.00,   -1000.00,    -800.00,
          -600.00,    -400.00,    -200.00,        .00,     200.00,     400.00,     600.00,     800.00,    1000.00,    1250.00,
          1500.00,    2000.00,    3000.00,
 AZIMUTH BEARING Y SPECIAL DISCRETE POINTS (DEGREES)=      14.00,

                        - AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -

                 STABILITY  STABILITY  STABILITY  STABILITY  STABILITY  STABILITY
                 CATEGORY 1 CATEGORY 2 CATEGORY 3 CATEGORY 4 CATEGORY 5 CATEGORY 6
        SEASON  1   287.2000   287.2000   283.2000   280.8000   279.1000   279.1000

                                - MIXING LAYER HEIGHT (METERS) -

                                                SEASON 1
                    WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED
                    CATEGORY 1  CATEGORY 2  CATEGORY 3  CATEGORY 4  CATEGORY 5  CATEGORY 6
STABILITY CATEGORY 1 .173000+004 .173000+004 .173000+004 .173000+004 .173000+004 .173000+004
STABILITY CATEGORY 2 .173000+004 .173000+004 .173000+004 .173000+004 .173000+004 .173000+004
STABILITY CATEGORY 3 .960000+003 .102500+004 .123500+004 .129500+004 .129500+004 .129500+004
STABILITY CATEGORY 4 .320000+003 .500000+003 .840000+003 .840000+003 .840000+003 .840000+003
STABILITY CATEGORY 5 .100000+005 .100000+005 .100000+005 .100000+005 .100000+005 .100000+005
STABILITY CATEGORY 6 .100000+005 .100000+005 .100000+005 .100000+005 .100000+005 .100000+005
```

Figure D-2. (Continued).

- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 1

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.5000MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00016950	.00008560	.00000000	.00000000	.00000000	.00000000
22.500	.00012830	.00019980	.00000000	.00000000	.00000000	.00000000
45.000	.00009180	.00019980	.00000000	.00000000	.00000000	.00000000
67.500	.00010760	.00025690	.00000000	.00000000	.00000000	.00000000
90.000	.00031190	.00059950	.00000000	.00000000	.00000000	.00000000
112.500	.00036110	.00051390	.00000000	.00000000	.00000000	.00000000
135.000	.00038650	.00034260	.00000000	.00000000	.00000000	.00000000
157.500	.00069530	.00079930	.00000000	.00000000	.00000000	.00000000
180.000	.00067470	.00085640	.00000000	.00000000	.00000000	.00000000
202.500	.00055120	.00054240	.00000000	.00000000	.00000000	.00000000
225.000	.00014410	.00025690	.00000000	.00000000	.00000000	.00000000
247.500	.00011550	.00028550	.00000000	.00000000	.00000000	.00000000
270.000	.00028990	.00025690	.00000000	.00000000	.00000000	.00000000
292.500	.00008390	.00017130	.00000000	.00000000	.00000000	.00000000
315.000	.00006020	.00008560	.00000000	.00000000	.00000000	.00000000
337.500	.00028200	.00022840	.00000000	.00000000	.00000000	.00000000

SEASON 1

STABILITY CATEGORY 2

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.5000MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00073530	.00077080	.00057100	.00000000	.00000000	.00000000
22.500	.00104880	.00108480	.00048530	.00000000	.00000000	.00000000
45.000	.00044440	.00068510	.00019980	.00000000	.00000000	.00000000
67.500	.00096290	.00148450	.00085640	.00000000	.00000000	.00000000
90.000	.00187750	.00279770	.00168430	.00000000	.00000000	.00000000
112.500	.00168920	.00279770	.00276910	.00000000	.00000000	.00000000
135.000	.00197700	.00316880	.00342570	.00000000	.00000000	.00000000
157.500	.00262380	.00399670	.00425361	.00000000	.00000000	.00000000
180.000	.00459181	.00422511	.00285480	.00000000	.00000000	.00000000
202.500	.00262740	.00308320	.00105630	.00000000	.00000000	.00000000
225.000	.00145670	.00108490	.00062810	.00000000	.00000000	.00000000
247.500	.00165270	.00211250	.00071370	.00000000	.00000000	.00000000
270.000	.00249990	.00211250	.00111340	.00000000	.00000000	.00000000
292.500	.00134250	.00119900	.00077080	.00000000	.00000000	.00000000
315.000	.00091510	.00068510	.00045680	.00000000	.00000000	.00000000
337.500	.00073250	.00074220	.00037110	.00000000	.00000000	.00000000

Figure D-2. (Continued).

- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 3

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.5000MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00046450	.00094210	.00125610	.00014270	.00002850	.00000000
22.500	.00069900	.00079930	.00151300	.00048530	.00014270	.00002850
45.000	.00026680	.00074220	.00094210	.00042820	.00002850	.00000000
67.500	.00053170	.00145590	.00157010	.00042820	.00005710	.00000000
90.000	.00068820	.00279770	.00585231	.00071370	.00008560	.00000000
112.500	.00069610	.00376830	.00696571	.00211250	.00014270	.00000000
135.000	.00058420	.00305460	.00756521	.00316880	.00017130	.00000000
157.500	.00060830	.00425361	.00810761	.00259780	.00019980	.00000000
180.000	.00117710	.00408231	.00511011	.00062810	.00011420	.00002850
202.500	.00077160	.00353990	.00245510	.00025690	.00011420	.00008560
225.000	.00060500	.00162720	.00202690	.00045680	.00008560	.00014270
247.500	.00082450	.00385390	.00288330	.00051390	.00017130	.00034260
270.000	.00141350	.00439641	.00596651	.00111340	.00028550	.00034260
292.500	.00085360	.00211250	.00339720	.00051390	.00025690	.00022840
315.000	.00035030	.00105630	.00134170	.00017130	.00005710	.00002850
337.500	.00065610	.00105630	.00094210	.00011420	.00005710	.00000000

SEASON 1

STABILITY CATEGORY 4

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.5000MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00095500	.00259780	.00790771	.01367442	.01127641	.01027721
22.500	.00068970	.00274060	.00887841	.01347452	.00807901	.00505301
45.000	.00039840	.00168430	.00659451	.00553831	.00205540	.00054240
67.500	.00084830	.00408231	.00862141	.00616631	.00114190	.00019980
90.000	.00198280	.00619491	.01490192	.01247542	.00194120	.00022840
112.500	.00133650	.00533841	.01661482	.01841332	.00322590	.00048530
135.000	.00071740	.00353990	.00907821	.01190441	.00171290	.00019980
157.500	.00098470	.00342570	.00659451	.00702281	.00119900	.00025690
180.000	.00100970	.00376830	.00468181	.00451051	.00125610	.00062810
202.500	.00057970	.00291190	.00214110	.00342570	.00131320	.00048530
225.000	.00049800	.00137030	.00225530	.00345430	.00199830	.00125610
247.500	.00055930	.00179850	.00505301	.00588081	.00285480	.00208400
270.000	.00122310	.00459621	.00913531	.01484482	.00790771	.00576671
292.500	.00069900	.00302690	.00742241	.01415972	.01061981	.00659451
315.000	.00053550	.00188420	.00511011	.00759371	.00294040	.00194120
337.500	.00074000	.00216960	.00653741	.00559541	.00262640	.00159870

Figure D-2. (Continued).

- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 5

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.5000MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00000000	.00525281	.00950641	.00000000	.00000000	.00000000
22.500	.00000000	.00325440	.00767941	.00000000	.00000000	.00000000
45.000	.00000000	.00177000	.00570961	.00000000	.00000000	.00000000
67.500	.00000000	.00336860	.00759371	.00000000	.00000000	.00000000
90.000	.00000000	.00496731	.00970621	.00000000	.00000000	.00000000
112.500	.00000000	.00274060	.00562391	.00000000	.00000000	.00000000
135.000	.00000000	.00177000	.00274060	.00000000	.00000000	.00000000
157.500	.00000000	.00236950	.00182710	.00000000	.00000000	.00000000
180.000	.00000000	.00245510	.00157010	.00000000	.00000000	.00000000
202.500	.00000000	.00182710	.00131320	.00000000	.00000000	.00000000
225.000	.00000000	.00165580	.00199830	.00000000	.00000000	.00000000
247.500	.00000000	.00342570	.00553831	.00000000	.00000000	.00000000
270.000	.00000000	.00668021	.01116221	.00000000	.00000000	.00000000
292.500	.00000000	.00499591	.00702281	.00000000	.00000000	.00000000
315.000	.00000000	.00356850	.00630911	.00000000	.00000000	.00000000
337.500	.00000000	.00522421	.00899251	.00000000	.00000000	.00000000

SEASON 1

STABILITY CATEGORY 6

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.5000MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00684121	.00973481	.00000000	.00000000	.00000000	.00000000
22.500	.00373070	.00559541	.00000000	.00000000	.00000000	.00000000
45.000	.00247790	.00431071	.00000000	.00000000	.00000000	.00000000
67.500	.00283840	.00493681	.00000000	.00000000	.00000000	.00000000
90.000	.00475321	.00773641	.00000000	.00000000	.00000000	.00000000
112.500	.00306470	.00491021	.00000000	.00000000	.00000000	.00000000
135.000	.00320440	.00282620	.00000000	.00000000	.00000000	.00000000
157.500	.00356230	.00236950	.00000000	.00000000	.00000000	.00000000
180.000	.00470731	.00316880	.00000000	.00000000	.00000000	.00000000
202.500	.00486151	.00416801	.00000000	.00000000	.00000000	.00000000
225.000	.00296740	.00342570	.00000000	.00000000	.00000000	.00000000
247.500	.00590741	.00944931	.00000000	.00000000	.00000000	.00000000
270.000	.01170781	.02055443	.00000000	.00000000	.00000000	.00000000
292.500	.00742881	.01204721	.00000000	.00000000	.00000000	.00000000
315.000	.00629421	.00982041	.00000000	.00000000	.00000000	.00000000
337.500	.00761371	.01281602	.00000000	.00000000	.00000000	.00000000

Figure D-2. (Continued).

- ISCLT INPUT DATA (CONT.) -

- VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGREES KELVIN/METER) -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	.000000	.000000	.000000	.000000	.000000	.000000
STABILITY CATEGORY 2	.000000	.000000	.000000	.000000	.000000	.000000
STABILITY CATEGORY 3	.000000	.000000	.000000	.000000	.000000	.000000
STABILITY CATEGORY 4	.000000	.000000	.000000	.000000	.000000	.000000
STABILITY CATEGORY 5	.200000-001	.200000-001	.200000-001	.200000-001	.200000-001	.200000-001
STABILITY CATEGORY 6	.350000-001	.350000-001	.350000-001	.350000-001	.350000-001	.350000-001

- WIND PROFILE POWER LAW EXPONENTS -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	.700000-001	.700000-001	.700000-001	.700000-001	.700000-001	.700000-001
STABILITY CATEGORY 2	.700000-001	.700000-001	.700000-001	.700000-001	.700000-001	.700000-001
STABILITY CATEGORY 3	.100000+000	.100000+000	.100000+000	.100000+000	.100000+000	.100000+000
STABILITY CATEGORY 4	.150000+000	.150000+000	.150000+000	.150000+000	.150000+000	.150000+000
STABILITY CATEGORY 5	.350000+000	.350000+000	.350000+000	.350000+000	.350000+000	.350000+000
STABILITY CATEGORY 6	.550000+000	.550000+000	.550000+000	.550000+000	.550000+000	.550000+000

Figure D-2. (Continued).

**** ISCLT ********** HYPOTHETICAL POTASH PROCESSING PLANT ******** PAGE 6 ****

- SOURCE INPUT DATA -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		1	AREA	-13.30	-13.30	10.00	.00	WIDTH OF AREA (M)= 26.60

- PARTICULATE CATEGORIES -

	1	2	3	4	5	6
FALL VELOCITY (MPS)	.0010	.0070	.0190	.0370	.0610	.0990
MASS FRACTION	.1000	.4000	.2800	.1200	.0600	.0400
REFLECTION COEFFICIENT	1.0000	.8200	.7200	.6500	.5900	.5000

- SOURCE STRENGTHS (GRAMS PER SEC PER SQUARE METER) -

- SEASON 1 -

SPEED CATEGORY	- STABILITY CATEGORIES - (1)	(2)	(3)	(4)	(5)	(6)
1	4.00000-001	3.00000-001	2.00000-001	1.00000-001	.00000	5.00000-002
2	5.00000-001	4.00000-001	3.00000-001	2.50000-001	2.00000-001	1.00000-001
3	.00000	5.00000-001	4.00000-001	5.00000-001	2.50000-001	.00000
4	.00000	.00000	5.00000-001	5.00000-001	.00000	.00000
5	.00000	.00000	7.00000-001	7.00000-001	.00000	.00000
6	.00000	.00000	1.00000+000	1.00000+000	.00000	.00000

WARNING - DISTANCE BETWEEN SOURCE 1 AND POINT X,Y= .00, .00 IS LESS THAN PERMITTED

X	2	VOLUME	20.00	.00	.90	.00

STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

	1	2	3	4	5	6
FALL VELOCITY (MPS)	.0010	.0070	.0190	.0370	.0610	.0990
MASS FRACTION	.1000	.4000	.2800	.1200	.0600	.0400
REFLECTION COEFFICIENT	1.0000	.8200	.7200	.6500	.5900	.5000

- SOURCE STRENGTHS (GRAMS PER SEC) -

- SEASON 1 -

SPEED CATEGORY	- STABILITY CATEGORIES - (1)	(2)	(3)	(4)	(5)	(6)
1	1.30000-001	1.00000-001	8.00000-002	4.00000-002	.00000	2.00000-002
2	1.60000-001	1.30000-001	1.20000-001	1.00000-001	8.00000-002	5.00000-002
3	.00000	1.60000-001	1.40000-001	1.30000-001	1.00000-001	.00000
4	.00000	.00000	1.60000-001	1.60000-001	.00000	.00000
5	.00000	.00000	1.90000-001	1.90000-001	.00000	.00000
6	.00000	.00000	2.20000-001	2.20000-001	.00000	.00000

Figure D-2. (Continued).

- SOURCE INPUT DATA -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE / ELEV- / ATION / (M) /	- SOURCE DETAILS DEPENDING ON TYPE -
X		3	VOLUME	30.00	.00	2.60	.00	STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70 STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

	1	2	3	4	5	6
FALL VELOCITY (MPS)	.0010	.0070	.0190	.0370	.0610	.0990
MASS FRACTION	.1000	.4000	.2800	.1200	.0600	.0400
REFLECTION COEFFICIENT	1.0000	.8200	.7200	.6500	.5900	.5000

- SOURCE STRENGTHS (GRAMS PER SEC - SEASON 1 -) -

- STABILITY CATEGORIES -

SPEED CATEGORY	(1)	(2)	(3)	(4)	(5)	(6)
1	1.30000-001	1.00000-001	8.00000-002	4.00000-002	.00000	2.00000-002
2	1.60000-001	1.30000-001	1.20000-001	1.00000-001	8.00000-002	5.00000-002
3	.00000	1.60000-001	1.40000-001	1.30000-001	1.00000-001	.00000
4	.00000	.00000	1.60000-001	1.60000-001	.00000	.00000
5	.00000	.00000	1.90000-001	1.90000-001	.00000	.00000
6	.00000	.00000	2.20000-001	2.20000-001	.00000	.00000

X		4	VOLUME	40.00	.00	4.30	.00	STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70 STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

	1	2	3	4	5	6
FALL VELOCITY (MPS)	.0010	.0070	.0190	.0370	.0610	.0990
MASS FRACTION	.1000	.4000	.2800	.1200	.0600	.0400
REFLECTION COEFFICIENT	1.0000	.8200	.7200	.6500	.5900	.5000

- SOURCE STRENGTHS (GRAMS PER SEC - SEASON 1 -) -

- STABILITY CATEGORIES -

SPEED CATEGORY	(1)	(2)	(3)	(4)	(5)	(6)
1	1.30000-001	1.00000-001	8.00000-002	4.00000-002	.00000	2.00000-002
2	1.60000-001	1.30000-001	1.20000-001	1.00000-001	8.00000-002	5.00000-002
3	.00000	1.60000-001	1.40000-001	1.30000-001	1.00000-001	.00000
4	.00000	.00000	1.60000-001	1.60000-001	.00000	.00000
5	.00000	.00000	1.90000-001	1.90000-001	.00000	.00000
6	.00000	.00000	2.20000-001	2.20000-001	.00000	.00000

Figure D-2. (Continued).

- SOURCE INPUT DATA -

C A R O	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		5	VOLUME	49.00	.00	6.10	.00	STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
								STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

	1	2	3	4	5	6
FALL VELOCITY (MPS)	.0010	.0070	.0190	.0370	.0610	.0990
MASS FRACTION	.1000	.4000	.2800	.1200	.0600	.0400
REFLECTION COEFFICIENT	1.0000	.8200	.7200	.6500	.5900	.5000

- SOURCE STRENGTHS (GRAMS PER SEC) -

- SEASON 1 -

SPEED CATEGORY	- STABILITY CATEGORIES - (1)	(2)	(3)	(4)	(5)	(6)
1	1.30000-001	1.00000-001	8.00000-002	4.00000-002	.00000	2.00000-002
2	1.60000-001	1.30000-001	1.20000-001	1.00000-001	8.00000-002	5.00000-002
3	.00000	1.60000-001	1.40000-001	1.30000-001	1.00000-001	.00000
4	.00000	.00000	1.60000-001	1.60000-001	.00000	.00000
5	.00000	.00000	1.90000-001	1.90000-001	.00000	.00000
6	.00000	.00000	2.20000-001	2.20000-001	.00000	.00000

X		6	VOLUME	59.00	.00	7.80	.00	STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
								STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

	1	2	3	4	5	6
FALL VELOCITY (MPS)	.0010	.0070	.0190	.0370	.0610	.0990
MASS FRACTION	.1000	.4000	.2800	.1200	.0600	.0400
REFLECTION COEFFICIENT	1.0000	.8200	.7200	.6500	.5900	.5000

- SOURCE STRENGTHS (GRAMS PER SEC) -

- SEASON 1 -

SPEED CATEGORY	- STABILITY CATEGORIES - (1)	(2)	(3)	(4)	(5)	(6)
1	1.30000-001	1.00000-001	8.00000-002	4.00000-002	.00000	2.00000-002
2	1.60000-001	1.30000-001	1.20000-001	1.00000-001	8.00000-002	5.00000-002
3	.00000	1.60000-001	1.40000-001	1.30000-001	1.00000-001	.00000
4	.00000	.00000	1.60000-001	1.60000-001	.00000	.00000
5	.00000	.00000	1.90000-001	1.90000-001	.00000	.00000
6	.00000	.00000	2.20000-001	2.20000-001	.00000	.00000

Figure D-2. (Continued).

- SOURCE INPUT DATA -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		7	VOLUME	69.00	.00	9.60	.00	STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
								STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

	1	2	3	4	5	6
FALL VELOCITY (MPS)	.0010	.0070	.0190	.0370	.0610	.0990
MASS FRACTION	.1000	.4000	.2800	.1200	.0600	.0400
REFLECTION COEFFICIENT	1.0000	.8200	.7200	.6500	.5900	.5000

- SOURCE STRENGTHS (GRAMS PER SEC) -

- SEASON 1 -

SPEED CATEGORY	- STABILITY CATEGORIES - (1)	(2)	(3)	(4)	(5)	(6)
1	1.30000-001	1.00000-001	8.00000-002	4.00000-002	.00000	2.00000-002
2	1.60000-001	1.30000-001	1.20000-001	1.00000-001	8.00000-002	5.00000-002
3	.00000	1.60000-001	1.40000-001	1.30000-001	1.00000-001	.00000
4	.00000	.00000	1.60000-001	1.60000-001	.00000	.00000
5	.00000	.00000	1.90000-001	1.90000-001	.00000	.00000
6	.00000	.00000	2.20000-001	2.20000-001	.00000	.00000

X		8	VOLUME	79.00	.00	11.30	.00	STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
								STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

	1	2	3	4	5	6
FALL VELOCITY (MPS)	.0010	.0070	.0190	.0370	.0610	.0990
MASS FRACTION	.1000	.4000	.2800	.1200	.0600	.0400
REFLECTION COEFFICIENT	1.0000	.8200	.7200	.6500	.5900	.5000

- SOURCE STRENGTHS (GRAMS PER SEC) -

- SEASON 1 -

SPEED CATEGORY	- STABILITY CATEGORIES - (1)	(2)	(3)	(4)	(5)	(6)
1	1.30000-001	1.00000-001	8.00000-002	4.00000-002	.00000	2.00000-002
2	1.60000-001	1.30000-001	1.20000-001	1.00000-001	8.00000-002	5.00000-002
3	.00000	1.60000-001	1.40000-001	1.30000-001	1.00000-001	.00000
4	.00000	.00000	1.60000-001	1.60000-001	.00000	.00000
5	.00000	.00000	1.90000-001	1.90000-001	.00000	.00000
6	.00000	.00000	2.20000-001	2.20000-001	.00000	.00000

Figure D-2. (Continued).

- SOURCE INPUT DATA -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		9	VOLUME	89.00	.00	13.00	.00	STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
								STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

	1	2	3	4	5	6
FALL VELOCITY (MPS)	.0010	.0070	.0190	.0370	.0610	.0990
MASS FRACTION	.1000	.4000	.2800	.1200	.0600	.0400
REFLECTION COEFFICIENT	1.0000	.8200	.7200	.6500	.5900	.5000

- SOURCE STRENGTHS (GRAMS PER SEC) -

- SEASON 1 -

SPEED CATEGORY	- STABILITY CATEGORIES - (1)	(2)	(3)	(4)	(5)	(6)
1	1.30000-001	1.00000-001	8.00000-002	4.00000-002	.00000	2.00000-002
2	1.60000-001	1.30000-001	1.20000-001	1.00000-001	8.00000-002	5.00000-002
3	.00000	1.60000-001	1.40000-001	1.30000-001	1.00000-001	.00000
4	.00000	.00000	1.60000-001	1.60000-001	.00000	.00000
5	.00000	.00000	1.90000-001	1.90000-001	.00000	.00000
6	.00000	.00000	2.20000-001	2.20000-001	.00000	.00000

X		10	VOLUME	99.00	.00	14.80	.00	STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
								STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

	1	2	3	4	5	6
FALL VELOCITY (MPS)	.0010	.0070	.0190	.0370	.0610	.0990
MASS FRACTION	.1000	.4000	.2800	.1200	.0600	.0400
REFLECTION COEFFICIENT	1.0000	.8200	.7200	.6500	.5900	.5000

- SOURCE STRENGTHS (GRAMS PER SEC) -

- SEASON 1 -

SPEED CATEGORY	- STABILITY CATEGORIES - (1)	(2)	(3)	(4)	(5)	(6)
1	1.30000-001	1.00000-001	8.00000-002	4.00000-002	.00000	2.00000-002
2	1.60000-001	1.30000-001	1.20000-001	1.00000-001	8.00000-002	5.00000-002
3	.00000	1.60000-001	1.40000-001	1.30000-001	1.00000-001	.00000
4	.00000	.00000	1.60000-001	1.60000-001	.00000	.00000
5	.00000	.00000	1.90000-001	1.90000-001	.00000	.00000
6	.00000	.00000	2.20000-001	2.20000-001	.00000	.00000

Figure D-2. (Continued).

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**** ISCLT *************                HYPOTHETICAL POTASH PROCESSING PLANT                    ******** PAGE     11 ****

                                                  - SOURCE INPUT DATA -

C T SOURCE SOURCE     X          Y      EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE  COORDINATE  HEIGHT  ELEV- /                - SOURCE DETAILS DEPENDING ON TYPE -
R P                  (M)         (M)       (M)   ATION /
D E                                              (M)  /
-----------------------------------------------------------------------------------------------------------------------------
X       11 VOLUME      109.00        .00  16.50     .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=   4.70
                                                         STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=   1.00
                                                                          - PARTICULATE CATEGORIES -
                                                                            1      2      3      4      5      6
                                                         FALL VELOCITY (MPS)     .0010  .0070  .0190  .0370  .0610  .0990
                                                         MASS FRACTION           .1000  .4000  .2800  .1200  .0600  .0400
                                                         REFLECTION COEFFICIENT 1.0000  .8200  .7200  .6500  .5900  .5000
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                          ) -
                                                                                        - SEASON 1 -
                                      SPEED CATEGORY                          - STABILITY CATEGORIES -
                                                          (1)          (2)          (3)          (4)          (5)          (6)
                                             1       1.30000-001  1.00000-001  8.00000-002  4.00000-002   .00000      2.00000-002
                                             2       1.60000-001  1.30000-001  1.20000-001  1.00000-001  8.00000-002  5.00000-002
                                             3        .00000      1.60000-001  1.40000-001  1.30000-001  1.00000-001   .00000
                                             4        .00000       .00000      1.60000-001  1.60000-001   .00000       .00000
                                             5        .00000       .00000      1.90000-001  1.90000-001   .00000       .00000
                                             6        .00000       .00000      2.20000-001  2.20000-001   .00000       .00000
X       12 VOLUME      121.00        .00  22.50     .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.80
                                                         STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=  11.60
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                          ) -
                                                                    SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                  2.63000+000
X       13 VOLUME      144.00        .00  22.50     .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.80
                                                         STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=  11.60
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                          ) -
                                                                    SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                  2.63000+000
X       14 VOLUME      167.00        .00  22.50     .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.80
                                                         STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=  11.60
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                          ) -
                                                                    SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                  2.63000+000
X       15 VOLUME      190.00        .00  22.50     .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.80
                                                         STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=  11.60
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                          ) -
                                                                    SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                  2.63000+000
WARNING - DISTANCE BETWEEN SOURCE     15 AND POINT X,Y=     200.00,        .00 IS LESS THAN PERMITTED
X       16  STACK      201.00      30.00  50.00     .00 GAS EXIT TEMP (DEG K)= 340.00, GAS EXIT VEL. (M/SEC)=  8.00,
                                                         STACK DIAMETER (M)= 1.000, HEIGHT OF ASSO. BLDG. (M)= 25.00, WIDTH OF
                                                         ASSO. BLDG. (M)=  67.00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                          ) -
                                                                    SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                  5.00000+000
WARNING - DISTANCE BETWEEN SOURCE     16 AND POINT X,Y=     200.00,        .00 IS LESS THAN PERMITTED
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Figure D-2. (Continued).

**** ISCLT ************** HYPOTHETICAL POTASH PROCESSING PLANT ******** PAGE 12 ****

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 1 **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-3000.000	-2000.000	-1500.000	-1250.000	-1000.000	-800.000	-600.000	-400.000	-200.000
				- CONCENTRATION -					
3000.000	14.694939	17.740330	19.059936	19.739814	20.038158	20.465120	20.717094	20.771536	20.603538
2000.000	24.302441	29.608470	33.920876	36.464540	38.507621	39.502174	41.067560	42.036382	42.088817
1500.000	30.762213	42.673197	49.010515	52.611596	58.583042	62.666197	65.989618	68.551908	69.821260
1250.000	34.886642	51.239852	61.515057	67.539449	73.669224	81.491526	87.788735	92.463557	95.893963
1000.000	36.612810	60.818020	78.605643	88.323235	100.093095	107.929635	122.231598	136.200083	140.463684
800.000	37.995659	69.478446	94.423663	111.070321	129.053152	148.213663	163.112898	189.263662	206.542271
600.000	39.116838	73.918410	113.613680	137.162146	170.321265	201.519106	248.836727	286.228844	331.787094
400.000	39.927816	77.430562	122.082540	160.872080	226.415386	281.609787	372.539582	518.138878	622.779861
200.000	40.370279	79.510048	128.140215	172.451950	245.976141	353.472965	550.332375	882.257034	1613.878723
.000	40.979896	81.543497	133.067314	181.099644	263.298332	388.629272	635.748596	1217.754547	2954.066681
-200.000	37.459093	71.090247	110.522025	144.552137	197.574209	269.205189	383.435799	520.787308	1037.923401
-400.000	34.633294	62.453043	91.546115	113.612117	145.644056	172.242220	229.666870	352.263115	658.313255
-600.000	31.627005	53.339277	72.689496	84.629873	106.401945	127.545597	171.558754	274.716499	464.680809
-800.000	28.523260	44.301801	58.956098	70.323149	83.278643	103.011294	147.471733	220.209049	312.341709
-1000.000	25.391930	37.937536	50.253506	57.552294	70.039513	94.192499	131.262175	187.594975	223.842525
-1250.000	21.765865	32.752200	40.629251	47.535768	65.105455	85.567405	110.083417	139.812283	161.129984
-1500.000	19.315297	28.008097	34.664792	45.215777	60.561036	75.301590	95.319164	109.308763	121.976810
-2000.000	15.833028	21.135674	32.512882	40.348825	49.406232	58.718858	65.627118	72.084106	77.578905
-3000.000	10.623216	19.209295	25.329159	29.415417	32.301473	34.640580	36.833163	38.819043	40.524932

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	.000	200.000	400.000	600.000	800.000	1000.000	1250.000	1500.000	2000.000
				- CONCENTRATION -					
3000.000	20.561385	19.250212	18.314191	17.246256	16.082750	14.854356	13.454515	12.208061	10.331922
2000.000	42.181269	38.117813	34.988705	31.403325	27.648318	24.590035	21.686514	18.937526	14.971287
1500.000	70.489342	61.410886	54.019938	46.191466	39.150154	34.056457	28.238364	24.858001	24.231983
1250.000	97.570199	82.454284	69.785025	56.485029	48.009252	40.177439	34.371873	33.637501	30.631876
1000.000	145.075630	116.853097	95.211921	73.368764	58.870375	51.196520	49.112298	46.231785	38.110562
800.000	218.223764	164.957937	119.099558	90.876937	76.180847	71.799335	66.079905	58.495849	48.136865
600.000	367.055534	248.075336	164.264231	128.449055	114.408483	102.845301	86.692365	79.523463	62.061473
400.000	739.120125	378.098328	268.016754	216.096468	175.459341	160.757568	131.895990	108.979997	76.461813
200.000	2026.026093	821.064690	526.550797	443.259235	323.394745	242.842098	180.416180	139.292295	90.609410
.000	.000000	3254.023773	1471.954681	796.166214	495.569996	339.537441	235.025063	173.307035	106.566267
-200.000	2567.034790	1310.713470	819.536018	582.062675	396.051682	285.591663	205.671888	155.523102	98.548850
-400.000	1158.649185	630.950935	471.329025	353.892437	276.767231	233.460459	174.975306	137.264694	90.641037
-600.000	622.747154	430.117668	295.183231	234.068138	193.866336	167.731993	137.502249	117.769375	81.621239
-800.000	386.130802	296.093839	215.436956	168.535784	141.785255	125.051361	109.922016	94.690763	72.173792
-1000.000	263.989559	214.879730	174.356894	136.553247	111.420404	96.690296	86.338271	78.033554	61.539259
-1250.000	183.219280	155.865009	130.891008	105.972672	91.096764	77.034763	65.718378	60.309857	51.423201
-1500.000	135.501400	118.559653	103.386452	87.689623	74.677591	65.439378	54.717816	47.958244	42.502358
-2000.000	83.780705	75.847097	69.013844	61.419669	53.612286	47.712314	42.283891	37.092239	29.271084
-3000.000	42.601424	39.839943	37.671403	35.215941	32.598690	29.881367	26.791735	24.304282	20.608344

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 1 (CONT.) **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE 3000.000 , METERS)	- CONCENTRATION -
3000.000	7.401333
2000.000	14.275576
1500.000	19.257679
1250.000	22.905709
1000.000	28.727403
800.000	33.639297
600.000	38.617332
400.000	43.557491
200.000	48.334592
.000	53.794253
-200.000	51.171764
-400.000	48.732267
-600.000	45.957129
-800.000	42.944610
-1000.000	39.774530
-1250.000	35.972745
-1500.000	31.402745
-2000.000	24.585611
-3000.000	14.708533

- DISCRETE RECEPTORS -

X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION
2108.0	14.0	31.991203						

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 1,

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
200.00	.00	3254.023773
-200.00	.00	2954.066681
.00	-200.00	2567.034790
.00	200.00	2026.026093
-200.00	200.00	1613.878723
400.00	.00	1471.954681
200.00	-200.00	1310.713470
-400.00	.00	1217.754547
.00	-400.00	1158.649185

Figure D-2. (Continued).

**** ISCLT ************** HYPOTHETICAL POTASH PROCESSING PLANT ********* PAGE 14 ****

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 1 (CONT.) **

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 1,

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
-200.00	-200.00	1037.923401

Figure D-2. (Continued).

**** ISCLT ****************

HYPOTHETICAL POTASH PROCESSING PLANT

********* PAGE 15 ****

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 2 **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -
- CONCENTRATION -

Y AXIS (DISTANCE, METERS)	-3000.000	-2000.000	-1500.000	-1250.000	-1000.000	-800.000	-600.000	-400.000	-200.000
3000.000	.006730	.008287	.008983	.009236	.009545	.009789	.009952	.010022	.009989
2000.000	.011159	.013540	.015841	.017132	.018225	.019126	.019700	.020300	.020469
1500.000	.014086	.019696	.022381	.024558	.027572	.029734	.032241	.033154	.034101
1250.000	.016004	.023593	.028543	.030820	.034551	.038565	.042005	.044792	.047036
1000.000	.016862	.027942	.036365	.041114	.045676	.050903	.058405	.066454	.069388
800.000	.017600	.031888	.043588	.051573	.060465	.067723	.077737	.091801	.102619
600.000	.018226	.034228	.052058	.063537	.079605	.095262	.113624	.139222	.168535
400.000	.018715	.036141	.056896	.075008	.103902	.132076	.178210	.240611	.325497
200.000	.019042	.037418	.060319	.081332	.116533	.167675	.264930	.454026	.846305
.000	.019439	.038650	.063157	.086190	.125947	.186468	.310734	.634153	2.025068
-200.000	.017832	.034029	.053160	.069904	.096466	.132400	.193262	.291274	.571056
-400.000	.016556	.029969	.044185	.055183	.070553	.085232	.115604	.164732	.337402
-600.000	.015145	.025676	.035059	.041273	.052141	.062934	.078634	.130459	.228576
-800.000	.013687	.021410	.028571	.034130	.040539	.047335	.068876	.103216	.149225
-1000.000	.012215	.018332	.024259	.027797	.032181	.043764	.061018	.087536	.106018
-1250.000	.010559	.015769	.019519	.021881	.030135	.039518	.050820	.064948	.075518
-1500.000	.009310	.013438	.016001	.020918	.027892	.034614	.044455	.050584	.056800
-2000.000	.007592	.009801	.014992	.018525	.022613	.027147	.030124	.033216	.035882
-3000.000	.004953	.008822	.011562	.013169	.014744	.015843	.016881	.017828	.018652

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -
- CONCENTRATION -

Y AXIS (DISTANCE, METERS)	.000	200.000	400.000	600.000	800.000	1000.000	1250.000	1500.000	2000.000
3000.000	.009896	.009483	.009064	.008575	.008037	.007463	.006785	.006154	.005157
2000.000	.020291	.018933	.017544	.015858	.014036	.012499	.010945	.009490	.007228
1500.000	.033946	.030956	.027470	.023485	.020054	.017313	.014215	.012020	.012022
1250.000	.047095	.042018	.035921	.029280	.024661	.020437	.016655	.016699	.015319
1000.000	.070351	.060605	.048870	.038343	.030365	.024928	.024611	.023256	.019199
800.000	.106446	.087339	.063774	.047842	.037400	.036394	.033586	.029710	.024371
600.000	.182287	.136710	.090265	.064006	.059206	.053234	.044635	.040713	.031392
400.000	.389859	.244207	.140069	.117195	.093645	.084673	.068332	.055930	.038757
200.000	1.371331	.541728	.330957	.251855	.176255	.128960	.094171	.071792	.046014
.000	88.687690	3.572526	.985294	.462595	.272363	.180883	.122769	.089306	.054064
-200.000	1.988977	.954055	.504038	.324068	.211560	.149007	.105770	.079122	.049526
-400.000	.615843	.437242	.259200	.189848	.143494	.119928	.088109	.068728	.045054
-600.000	.302196	.241580	.166713	.121216	.099646	.084846	.068322	.058360	.040086
-800.000	.181917	.156406	.117381	.090758	.071940	.063182	.054689	.046548	.035202
-1000.000	.123067	.109972	.090794	.072570	.058702	.048492	.043059	.038472	.029850
-1250.000	.084647	.077644	.067226	.055574	.047518	.039943	.032720	.029887	.025057
-1500.000	.062286	.058067	.051942	.044931	.038695	.033762	.028071	.023796	.020823
-2000.000	.038348	.036431	.033790	.030701	.027359	.024486	.021616	.018888	.014481
-3000.000	.019466	.018829	.018006	.017057	.016015	.014907	.013632	.012361	.010424

Figure D-2. (Continued).

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 2 (CONT.) **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE 3000.000 , METERS)	- CONCENTRATION -
3000.000	.003569
2000.000	.007069
1500.000	.009616
1250.000	.011349
1000.000	.014373
800.000	.016843
600.000	.019349
400.000	.021841
200.000	.024248
.000	.026969
-200.000	.025480
-400.000	.024099
-600.000	.022558
-800.000	.020914
-1000.000	.019206
-1250.000	.017073
-1500.000	.015060
-2000.000	.011893
-3000.000	.007260

- DISCRETE RECEPTORS -

X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION
2108.0	14.0	.016086						

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 2, -11,

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
.00	.00	88.687690
200.00	.00	3.572526
-200.00	.00	2.025068
.00	-200.00	1.988977
.00	200.00	1.371331
400.00	.00	.985294
200.00	-200.00	.954055
-200.00	200.00	.846305
-400.00	.00	.634153

Figure D-2. (Continued).

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 2 (CONT.) **

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 2, -11,

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
.00	-400.00	.615843

Figure D-2. (Continued).

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM COMBINED SOURCES 2, -11,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-3000.000	-2000.000	-1500.000	-1250.000	-1000.000	-800.000	-600.000	-400.000	-200.000
	- CONCENTRATION -								
3000.000	.066996	.082302	.089468	.091964	.095036	.097678	.099548	.100516	.100472
2000.000	.110422	.133930	.155720	.168740	.180063	.187880	.194744	.201627	.204402
1500.000	.138662	.193662	.219558	.238872	.268724	.290774	.309875	.325304	.337388
1250.000	.155726	.230660	.279313	.300293	.333371	.372975	.408348	.436466	.461221
1000.000	.165035	.271644	.352334	.398465	.440305	.484755	.557971	.623482	.670176
800.000	.172153	.307500	.419001	.494259	.578877	.643423	.728308	.863472	.970124
600.000	.178195	.329555	.493893	.602513	.749190	.892299	1.048724	1.260705	1.575295
400.000	.182913	.347367	.538138	.701149	.952784	1.205805	1.594364	2.092759	2.756820
200.000	.186101	.359272	.568823	.756182	1.061057	1.482022	2.250297	3.813609	6.158075
.000	.190023	.371001	.594840	.799366	1.140937	1.632269	2.583886	4.772127	11.960189
-200.000	.175039	.327610	.503266	.653179	.884266	1.180988	1.664641	2.475178	3.777470
-400.000	.162303	.289603	.421361	.521513	.655235	.775440	1.022805	1.351135	2.535072
-600.000	.148759	.249354	.336838	.391097	.488908	.585195	.696850	1.090471	1.902211
-800.000	.134735	.208930	.274612	.326450	.386144	.436266	.608539	.909271	1.339877
-1000.000	.120555	.178504	.234836	.268591	.302841	.397535	.554191	.760380	.982285
-1250.000	.103752	.154339	.190664	.209211	.279984	.367164	.472771	.612299	.715085
-1500.000	.091914	.132189	.154622	.197280	.262986	.326594	.404542	.483097	.546184
-2000.000	.075314	.099868	.143958	.177899	.217283	.255461	.291887	.323153	.350616
-3000.000	.049045	.086223	.113009	.128224	.144859	.155987	.166558	.176277	.184839

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	.000	200.000	400.000	600.000	800.000	1000.000	1250.000	1500.000	2000.000
	- CONCENTRATION -								
3000.000	.099395	.096182	.092208	.087502	.082254	.076602	.069333	.063096	.052968
2000.000	.202590	.192563	.179016	.162798	.144930	.128293	.112633	.097821	.073052
1500.000	.336537	.313978	.281425	.242599	.206121	.178597	.147060	.121195	.121109
1250.000	.463789	.425952	.369234	.306430	.254314	.211646	.167635	.166410	.155225
1000.000	.684976	.613427	.502984	.394243	.314668	.249920	.244422	.234200	.195557
800.000	1.020374	.883270	.674599	.495000	.372634	.357824	.337206	.301364	.246916
600.000	1.694922	1.379131	.919989	.630846	.577869	.531359	.452348	.407216	.320555
400.000	3.379304	2.455755	1.331585	1.119356	.932453	.818713	.691666	.571243	.398253
200.000	9.828193	4.536105	2.940626	2.442560	1.764919	1.314065	.966140	.739486	.474780
.000	151.781187	23.636500	9.060389	4.619804	2.790868	1.870465	1.271050	.925674	.559778
-200.000	11.318276	6.828987	4.451818	3.228387	2.138862	1.526862	1.088396	.816511	.511463
-400.000	4.687866	3.968169	2.363297	1.822004	1.433528	1.183601	.899585	.705437	.463903
-600.000	2.572001	2.319116	1.630996	1.178826	.982389	.851100	.693809	.592635	.411006
-800.000	1.632346	1.533023	1.215313	.919102	.714301	.628391	.552084	.473330	.360814
-1000.000	1.136942	1.028379	.912852	.733760	.600678	.496736	.432174	.389568	.304337
-1250.000	.799444	.778192	.690859	.576910	.485256	.410615	.330609	.301051	.254781
-1500.000	.596412	.588264	.526372	.459209	.394686	.346218	.289236	.241126	.211147
-2000.000	.373069	.366837	.342393	.313199	.280941	.250326	.221818	.194360	.147249
-3000.000	.192147	.190157	.182483	.173464	.163439	.152655	.138865	.126664	.107125

Figure D-2. (Continued).

**** ISCLT ************** HYPOTHETICAL POTASH PROCESSING PLANT ********* PAGE 46 ****

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) (CONT.) FROM COMBINED SOURCES 2, -11,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) - 3000.000

Y AXIS (DISTANCE , METERS)	- CONCENTRATION -
3000.000	.036146
2000.000	.071751
1500.000	.098095
1250.000	.114272
1000.000	.146666
800.000	.172449
600.000	.198655
400.000	.224678
200.000	.249824
.000	.278227
-200.000	.262574
-400.000	.248029
-600.000	.231792
-800.000	.214453
-1000.000	.196766
-1250.000	.172508
-1500.000	.153591
-2000.000	.121069
-3000.000	.074004

- DISCRETE RECEPTORS -

X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION
2108.0	14.0	.164647						

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
.00	.00	151.781187
200.00	.00	23.636500
-200.00	.00	11.960189
.00	-200.00	11.318276
.00	200.00	9.828193
400.00	.00	9.060389
200.00	-200.00	6.828987
-200.00	200.00	6.159075
-400.00	.00	4.772127

Figure D-2. (Continued).

**** ISCLT ************** HYPOTHETICAL POTASH PROCESSING PLANT ******** PAGE 47 ****

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) (CONT.) FROM COMBINED SOURCES 2, -11,

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
.00	-400.00	4.687866

Figure D-2. (Continued).

**** ISCLT ************** HYPOTHETICAL POTASH PROCESSING PLANT ******** PAGE 60 ****

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM COMBINED SOURCES 12, -15,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-3000.000	-2000.000	-1500.000	-1250.000	-1000.000	-800.000	-600.000	-400.000	-200.000
	- CONCENTRATION -								
3000.000	.761770	.913400	1.004414	1.043227	1.097318	1.134168	1.173254	1.205097	1.228379
2000.000	1.141867	1.372372	1.529028	1.659487	1.778443	1.870379	1.991252	2.068716	2.147994
1500.000	1.375643	1.650413	2.064339	2.177970	2.394345	2.597194	2.786233	3.024596	3.150433
1250.000	1.555287	2.102560	2.482244	2.666630	2.846071	3.102237	3.411735	3.870709	3.980807
1000.000	1.654695	2.402559	2.966479	3.292783	3.614225	3.969446	4.247049	4.768987	5.390952
800.000	1.740491	2.726411	3.397590	3.865848	4.404581	4.856180	5.460820	5.952523	7.247478
600.000	1.818775	2.919727	3.986387	4.859529	5.316925	6.099183	6.969049	8.140697	9.136564
400.000	1.887473	3.098363	4.304455	5.221580	6.571609	8.422382	9.216727	10.958037	13.881349
200.000	1.944687	3.240901	4.571430	5.618594	7.151659	8.947813	11.662705	16.670878	22.077493
.000	2.055802	3.490970	5.002758	6.215974	8.031231	10.214259	13.585494	19.270468	30.924355
-200.000	1.860339	3.023258	4.157481	5.008488	6.193239	7.484593	9.251507	12.169548	13.588237
-400.000	1.738141	2.719346	3.596813	4.192921	4.995240	5.992803	6.086271	6.915211	9.795648
-600.000	1.609048	2.399424	3.039190	3.501342	3.652524	4.117614	4.604605	5.998398	8.047790
-800.000	1.475689	2.087705	2.412698	2.712348	3.048663	3.322135	4.129167	5.183474	7.809959
-1000.000	1.340627	1.741852	2.120898	2.334636	2.538554	3.053135	3.683982	4.716145	6.551013
-1250.000	1.188876	1.536371	1.797190	1.924582	2.282126	2.752904	3.375925	4.451518	5.187535
-1500.000	1.022552	1.352147	1.520410	1.761718	2.163176	2.576321	3.050430	3.866363	4.307350
-2000.000	.862947	1.041938	1.365583	1.620986	1.906946	2.171283	2.618086	2.876451	3.145808
-3000.000	.600805	.914465	1.145431	1.273804	1.487444	1.602494	1.723289	1.838733	1.946112

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	.000	200.000	400.000	600.000	800.000	1000.000	1250.000	1500.000	2000.000
	- CONCENTRATION -								
3000.000	1.242015	1.270693	1.213124	1.174963	1.129759	1.078897	1.009908	.924725	.773610
2000.000	2.192536	2.246854	2.085558	1.960184	1.814670	1.710877	1.428858	1.255966	.961216
1500.000	3.258063	3.337865	3.006055	2.725089	2.493014	2.054230	1.729386	1.455465	1.426758
1250.000	4.172939	4.272554	3.749706	3.350022	2.725899	2.315758	1.893275	1.838393	1.783701
1000.000	5.605846	5.732957	4.833446	4.159414	3.174491	2.606588	2.477219	2.414826	2.199683
800.000	7.453122	7.617677	6.169492	4.583254	3.591886	3.443437	3.183569	3.016919	2.860217
600.000	10.599771	10.763703	8.299770	5.403757	4.969984	4.492734	4.130747	4.155256	3.644918
400.000	18.082357	17.125082	9.950397	8.015761	6.864670	6.922053	6.624712	5.705509	4.425239
200.000	32.828888	34.847267	17.082127	16.251079	13.173162	10.813725	8.716227	7.180328	5.195702
.000	63.526520	97.718873	50.817300	30.163562	20.863201	15.774613	11.798674	9.253553	6.294835
-200.000	22.113643	36.232011	24.189043	20.742026	15.562080	12.254298	9.646070	7.818186	5.540433
-400.000	17.536629	20.530484	14.788746	12.719958	10.089924	9.488625	8.268621	6.740923	4.995657
-600.000	12.042532	14.269958	12.692368	9.034563	8.365817	6.952721	6.066908	5.691529	4.412014
-800.000	9.254277	10.816631	9.480651	7.709350	6.419793	6.026965	5.058894	4.545649	3.902256
-1000.000	7.407627	8.521041	7.578466	7.117639	5.652883	4.848473	4.351653	3.911429	3.252349
-1250.000	5.833904	6.609003	6.042388	5.701192	4.865727	4.278133	3.639933	3.325712	2.828982
-1500.000	4.746083	5.309840	4.946031	4.647631	4.498111	3.792025	3.300278	2.861965	2.449853
-2000.000	3.382595	3.716567	3.538194	3.407620	3.239875	3.179415	2.710214	2.437233	1.946652
-3000.000	2.042810	2.194115	2.131130	2.094876	2.045759	1.985588	1.898738	1.784493	1.533490

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) (CONT.) FROM COMBINED SOURCES 12, -15,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE 3000.000 , METERS)	- CONCENTRATION -
3000.000	.534587
2000.000	.965940
1500.000	1.289420
1250.000	1.530933
1000.000	1.952140
800.000	2.259086
600.000	2.570432
400.000	2.879373
200.000	3.180338
.000	3.621281
-200.000	3.319609
-400.000	3.113453
-600.000	2.893544
-800.000	2.663029
-1000.000	2.428285
-1250.000	2.125853
-1500.000	1.896808
-2000.000	1.576643
-3000.000	1.117217

- DISCRETE RECEPTORS -

X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION
2108.0	14.0	1.963157						

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
200.00	.00	97.718873
.00	.00	63.526520
400.00	.00	50.817300
200.00	-200.00	36.232011
200.00	200.00	34.847267
.00	200.00	32.828888
-200.00	.00	30.924355
600.00	.00	30.163562
400.00	-200.00	24.189043

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) (CONT.) FROM COMBINED SOURCES 12, -15,

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
.00	-200.00	22.113643

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 16 **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-3000.000	-2000.000	-1500.000	-1250.000	-1000.000	-800.000	-600.000	-400.000	-200.000
	- CONCENTRATION -								
3000.000	.177388	.206403	.224353	.231732	.238086	.244017	.248679	.251839	.253299
2000.000	.262836	.299572	.329146	.352823	.375700	.392613	.407280	.421342	.430203
1500.000	.315146	.393582	.427589	.441203	.486467	.523331	.556733	.590118	.615281
1250.000	.337194	.447760	.505445	.531094	.553763	.608157	.663994	.717423	.761749
1000.000	.348631	.505499	.593419	.640245	.684467	.713619	.791383	.882195	.968744
800.000	.356340	.531184	.669128	.737850	.811076	.868618	.918721	1.041089	1.182405
600.000	.362510	.545404	.710254	.829252	.950481	1.047801	1.146891	1.234261	1.428882
400.000	.366933	.554907	.726378	.851822	1.021490	1.205185	1.409165	1.580689	1.698725
200.000	.369447	.558961	.731890	.858707	1.030699	1.217255	1.468172	1.806140	2.227071
.000	.366300	.549441	.712939	.830738	.987386	1.152974	1.367003	1.630541	1.880698
-200.000	.340810	.491515	.612776	.691381	.783247	.862310	.931043	.942385	.932741
-400.000	.314343	.431723	.510932	.552148	.585637	.602868	.641129	.648416	.655884
-600.000	.287412	.372359	.413460	.431791	.464835	.484489	.488544	.499746	.772670
-800.000	.260512	.315514	.350004	.370944	.385860	.388144	.397685	.561508	.782614
-1000.000	.234092	.276749	.306851	.317412	.320159	.327767	.435536	.574932	.731618
-1250.000	.202313	.243834	.259484	.261213	.282965	.356772	.447883	.557012	.632742
-1500.000	.182741	.212972	.219482	.235243	.300394	.364062	.438616	.515437	.554778
-2000.000	.153067	.164167	.209063	.252129	.301421	.346423	.390791	.416663	.441087
-3000.000	.106405	.160864	.205795	.231034	.255781	.269101	.282105	.294530	.306096

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	.000	200.000	400.000	600.000	800.000	1000.000	1250.000	1500.000	2000.000
	- CONCENTRATION -								
3000.000	.252909	.250599	.238267	.224672	.210196	.195198	.176232	.158904	.133239
2000.000	.432750	.428300	.393528	.354720	.314131	.273719	.238035	.206579	.154824
1500.000	.626724	.621596	.549990	.470492	.390469	.334718	.275036	.225804	.210273
1250.000	.785215	.781430	.669346	.547059	.443108	.366138	.287495	.250401	.260877
1000.000	1.016240	1.017212	.827679	.629927	.495344	.387347	.323934	.336264	.320399
800.000	1.277606	1.284981	.978195	.706647	.519964	.406508	.429769	.421428	.373868
600.000	1.621313	1.612940	1.104953	.740714	.540227	.578071	.562408	.520705	.474070
400.000	1.895364	1.743761	1.058787	.727997	.828626	.804594	.757682	.704419	.587385
200.000	1.916890	.731186	.828559	1.257913	1.328210	1.229415	1.063197	.916288	.702750
.000	1.309162	.000000	1.733320	2.202352	1.902989	1.599053	1.294904	1.073248	.787341
-200.000	.942606	1.648424	1.110660	1.339593	1.356484	1.245492	1.079834	.932596	.715675
-400.000	1.189155	1.458144	.975513	.810881	.907010	.925803	.868320	.787926	.639593
-600.000	1.066731	1.184695	.886131	.728193	.630610	.671910	.683353	.653276	.563375
-800.000	.913063	.995926	.803378	.650122	.575231	.506885	.533387	.536760	.491873
-1000.000	.797671	.853177	.721016	.590647	.525060	.470768	.417113	.439542	.428223
-1250.000	.680480	.719658	.631379	.540664	.470210	.429528	.381510	.343402	.358744
-1500.000	.590468	.619735	.557461	.492203	.429022	.392937	.355017	.319683	.300667
-2000.000	.462939	.481129	.446515	.409629	.372378	.336189	.308451	.284526	.239362
-3000.000	.316532	.325584	.311389	.296176	.280391	.264355	.244410	.226224	.200277

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 16 (CONT.) **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE 3000.000 , METERS)	- CONCENTRATION -
3000.000	.091826
2000.000	.152286
1500.000	.200150
1250.000	.227351
1000.000	.275918
800.000	.322264
600.000	.370191
400.000	.418676
200.000	.466584
.000	.501958
-200.000	.473665
-400.000	.443613
-600.000	.412442
-800.000	.380919
-1000.000	.349740
-1250.000	.313713
-1500.000	.281734
-2000.000	.226120
-3000.000	.156546

- DISCRETE RECEPTORS -

X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION
2108.0	14.0	.363236						

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 16,

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
-200.00	200.00	2.227071
600.00	.00	2.202352
.00	200.00	1.916890
800.00	.00	1.902989
.00	400.00	1.895364
-200.00	.00	1.880698
-400.00	200.00	1.806140
200.00	400.00	1.743761
400.00	.00	1.733320

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 16 (CONT.) **

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 16,

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
-200.00	400.00	1.698725

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 2 **

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES -16,

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
200.00	.00	3.572526
-200.00	.00	2.025068
.00	-200.00	1.988977
.00	200.00	1.371331
-200.00	200.00	.846305
400.00	.00	.985294
200.00	-200.00	.954055
-400.00	.00	.634153
.00	-400.00	.615843
-200.00	-200.00	.571056

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM COMBINED SOURCES -16,

Y AXIS (DISTANCE, METERS)	- GRID SYSTEM RECEPTORS - X AXIS (DISTANCE, METERS) - CONCENTRATION -								
	-3000.000	-2000.000	-1500.000	-1250.000	-1000.000	-800.000	-600.000	-400.000	-200.000
3000.000	15.701092	18.942432	20.378169	21.106735	21.468597	21.940981	22.238572	22.328986	22.185686
2000.000	25.817565	31.414241	35.934766	38.644588	40.841823	41.953043	43.660832	44.728065	44.871413
1500.000	32.591661	45.095850	51.721999	55.469636	61.732574	66.077491	69.644453	72.491918	73.924355
1250.000	36.934844	54.020829	64.782055	71.037457	77.402421	85.574888	92.272807	97.488152	101.097733
1000.000	38.781167	63.997718	82.517870	92.654721	104.832087	113.097446	127.827990	142.474731	147.493542
800.000	40.264640	73.043536	98.909375	116.168270	134.847670	154.581869	170.220734	197.120735	215.942266
600.000	41.476315	77.713091	118.804207	143.453426	177.337866	209.558378	258.001373	296.864479	343.927803
400.000	42.365130	81.431193	127.651506	167.646616	234.961256	292.443138	384.760208	532.770309	641.116722
200.000	42.870509	83.669175	134.012341	179.685417	255.219542	365.120029	565.713493	904.547623	1644.341263
.000	43.592019	85.954903	139.377890	188.945707	273.457855	401.628742	653.284927	1243.427567	2998.831696
-200.000	39.835278	74.932621	115.795543	150.905167	205.434942	278.733051	395.282951	536.374367	1056.221741
-400.000	36.848078	65.893711	96.075214	118.878694	151.880154	179.613321	237.417061	361.177841	671.299797
-600.000	33.672222	56.360411	76.478976	88.954096	111.008204	132.732883	177.348738	282.305092	475.403450
-800.000	30.394194	46.913946	61.993407	73.732883	87.099301	107.157834	152.607111	226.863289	322.274128
-1000.000	27.087202	40.134638	52.916087	60.472929	73.201359	97.970929	135.935869	193.646418	232.107430
-1250.000	23.260803	34.686741	42.876585	49.930770	67.950522	89.044238	114.379989	145.433096	167.666132
-1500.000	20.612502	29.705405	36.559303	47.410013	63.287587	78.568563	99.212747	114.173650	127.385117
-2000.000	16.924355	22.437645	34.231482	42.399836	51.831877	61.492023	68.927876	75.700367	81.516409
-3000.000	11.379469	20.370844	26.793392	31.048478	34.189552	36.668157	39.005111	41.128579	42.961977

Y AXIS (DISTANCE, METERS)	- GRID SYSTEM RECEPTORS - X AXIS (DISTANCE, METERS) - CONCENTRATION -								
	200.000	400.000	600.000	800.000	1000.000	1250.000	1500.000	2000.000	
3000.000	22.155703	20.867685	19.657788	18.733391	17.504958	16.205052	14.709987	13.354785	11.291737
2000.000	45.009141	40.985526	37.646802	33.881024	29.922047	26.702922	23.466038	20.497890	16.160378
1500.000	74.710657	65.684319	57.857405	49.629642	42.239754	36.623999	30.389843	26.660464	25.990121
1250.000	102.992134	87.934212	74.573303	60.688537	51.432569	43.070980	36.720276	35.892703	32.831677
1000.000	152.382677	124.216688	101.376021	78.552341	62.854875	54.440372	52.157870	49.217071	40.826198
800.000	227.974852	174.743849	126.921836	96.666831	80.665323	76.007097	70.030441	62.235558	51.617862
600.000	380.971508	261.831093	174.588928	135.224356	120.496555	108.447457	91.837861	84.606634	66.501011
400.000	762.477081	399.420902	280.357494	225.959570	184.085079	169.302917	139.970036	115.961161	81.872684
200.000	2070.599854	861.179192	547.402039	463.210762	339.661007	256.199287	191.161726	148.128387	96.982635
.000	216.616867	3375.378967	1533.565567	833.151871	521.127014	358.781544	249.389673	184.559494	114.208215
-200.000	2601.409058	1355.422791	849.287483	607.372620	415.109077	300.618282	217.486170	165.090382	105.316413
-400.000	1182.062714	656.907669	489.456551	369.245255	289.197670	245.058674	185.011816	145.498962	96.740184
-600.000	638.428368	447.891403	310.392696	245.009705	203.847141	176.207712	144.946302	124.706807	87.007627
-800.000	397.935459	309.444393	226.936281	177.814844	149.494568	132.213593	116.066372	100.246495	76.928730
-1000.000	273.331772	225.342815	183.569214	144.995283	118.199018	102.496265	91.539205	82.774085	65.524164
-1250.000	190.533096	163.967846	138.245621	112.791331	96.917948	82.153031	70.070422	64.280018	54.865705
-1500.000	141.434347	125.071483	109.416309	93.288658	79.999403	69.970551	58.662344	51.381015	45.464022
-2000.000	87.999302	80.411623	73.340938	65.550113	57.505476	51.478241	45.524371	40.008355	31.604344
-3000.000	45.152909	42.599794	40.296408	37.780454	35.088275	32.283963	29.073747	26.441663	22.449233

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) (CONT.) FROM COMBINED SOURCES -16,

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE , METERS)	3000.000
	- CONCENTRATION -
3000.000	8.063892
2000.000	15.465553
1500.000	20.845341
1250.000	24.778264
1000.000	31.102125
800.000	36.393093
600.000	41.756608
400.000	47.080215
200.000	52.231333
.000	58.195716
-200.000	55.227629
-400.000	52.537358
-600.000	49.494904
-800.000	46.202988
-1000.000	42.749019
-1250.000	38.584816
-1500.000	33.734876
-2000.000	26.509442
-3000.000	16.056299

- DISCRETE RECEPTORS -

X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	CONCENTRATION
2108.0	14.0	34.482232						

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
200.00	.00	3375.378967
-200.00	.00	2998.831696
.00	-200.00	2601.409058
.00	200.00	2070.599854
-200.00	200.00	1644.341263
400.00	.00	1533.565567
200.00	-200.00	1355.422791
-400.00	.00	1243.427567
.00	-400.00	1182.062714

Figure D-2. (Continued).

```
**** ISCLT ***************          HYPOTHETICAL POTASH PROCESSING PLANT          ********* PAGE     84 ****

 **   ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER          ) (CONT.) FROM COMBINED SOURCES    -16,

                        - PROGRAM DETERMINED MAXIMUM 10 VALUES -

                            X              Y          CONCENTRATION
                        COORDINATE     COORDINATE

                         (METERS)       (METERS )
                        ------------------------------------------
                           -200.00        -200.00      1056.221741
```

Figure D-2. (Continued).

**** ISCLT ********** HYPOTHETICAL POTASH PROCESSING PLANT ********* PAGE 85 ****

- SUMMARY OF SOURCES OUTPUT TO TAPE -

NUMBER/TYPE	NUMBER/TYPE	NUMBER/TYPE	NUMBER/TYPE	NUMBER/TYPE	NUMBER/TYPE	NUMBER/TYPE	NUMBER/TYPE	NUMBER/TYPE	NUMBER/TYPE	NUMBER/TYPE
1 2	2 1	3 1	4 1	5 1	6 1	7 1	8 1	9 1	10 1	11 1
12 1	13 1	14 1	15 1	16 0						

considered, the default option was not incorporated, a pollutant other than SO_2 was modeled and an input debug mode was not used, respectively.

c. Card Group 3. Card Group 3 specifies the number of categories of meteorological data and the number of sources and receptors in the grid system. The parameter NSOURC is set equal to "16" for the 16 sources used to model the hypothetical potash plant. The parameter NGROUP equals "5" because we wish to print the output for five different source groupings. The parameters NXPNTS and NYPNTS are both set equal to "19" for the 19-X by 19-Y receptor grid system shown in Figure 2-1. The parameter NXWYPT is set to "1" and specifies one discrete point that is used in this example to represent an air quality monitor location. The parameters NSEASN through NSCTOR are all left blank so that they assume their respective default values of 1 season, 6 wind-speed categories, 6 stability categories and 16 wind-direction categories. The parameter NOFILE is set to equal to "1," because the tape output file will be the first file on tape.

d. Card Groups 4 and 4a. Card Groups 4 and 4a define the source combinations for which concentration or deposition output is to be produced. The parameter NGROUP on Card Group 3 specifies 5 source combinations. Card Group 4 (NOCOMB) gives the number of source ID-numbers the program is to use to define each source combination. The first output combination has one defining source, the second and third use two defining sources and the fourth and fifth use only one. Card Group 4a shows the actual source ID-numbers the program is to use in each source combination. The program is to output annual concentrations for Source 1, Sources 2 through 11 combined, Sources 12 through 15 combined, Sources 16, and all sources (1-16) combined.

e. Card Group 5. Card Group 5 specifies the output concentration units and input source emission units. Because we wish to use the program default units, this card is left blank. However, this card is still included in the input data deck. The output units are defaulted to "micrograms per cubic meter" and input source emission units are defaulted to "gram per sec" for the stack and volume sources and to "grams per sec per square meter" for the area source as shown in Figure D-2.

f. Card Groups 6, 6a, 7, and 7a. Card Groups 6, 6a, 7, and 7a define the locations of the receptors of the regular (non-discrete) grid system and the discrete point. The regular grid system (Card Groups 6 and 7) is in Cartesian coordinates and the discrete receptor (Card Groups 6a and 7a) is in polar coordinates.

g. Card Groups 8 and 8a. Card Groups 8 and 8a are not shown in Figure D-1 because we are assuming flat terrain (ISW(4) equal to "0").

h. Card Group 9. Card Group 9 is used to specify an optional format the program uses to read Card Group 9a. Because ISW(18) is left blank (zero), this card group is not used by the program and is omitted from the input deck. The program will use the default FORTRAN format of (6F10.0) to read the data shown in Card Group 9a. This default format requires the user to punch the frequency of occurrence data in Card Group 9a using 10 columns per value including the decimal point (period). NSPEED values are read per data card in Card Group 9a.

i. Card Group 9a. Card Group 9a gives the joint frequency of occurrence of wind speed and direction by stability category and season. As the example run is using annual data, only one season (annual) is punched. Within this one season, there are six stability categories (A through F) and within each stability category there are sixteen cards, one for each wind direction category clockwise from north to north-northwest. Each data card contains the frequency of occurrence for the six wind-speed categories. Values that are zero have been left blank because the ISCLT program interprets blanks as zeroes. If we were using seasonal data in the example problem, the program would require NSEASN decks to be input.

j. Card Group 10. Card Group 10 gives the annual ambient air temperatures in degrees Kelvin for stability categories A through F.

k. Card Group 11. Card Group 11 gives the annual mixing heights in meters by stability and wind-speed. The mixing heights are punched, six values per card, for wind-speed categories 1 through 6, and there are six cards for stability categories A through F. If we were using seasonal data in this example run, the program would require NSEASN groups of these data cards. For the purpose of this example, it is assumed that the median mixing heights shown in Figure D-1 have been developed as a function of wind-speed and stability using on-site acoustic radar data. Some values have been left blank in this card group for stability categories A through D because the joint frequency of occurrence of these wind-speed and stability categories is zero (and no calculations will take place). The values for stability categories E and F have been left blank because the case is being run in the Rural Mode and the program automatically uses 10,000 meters. Note also that

the decimal point is not punched. The decimal point can be eliminated in real variables only when the value is a whole number and right justified in the respective punch columns.

1. Card Groups 12 through 16. Card Groups 12 through 16 provide the remaining meteorological and model data. These card groups are all blank, but must be included in the input data deck. The program provides default values for all of these data items and their respective values are shown in Figure D-2 under the "ISCLT INPUT DATA" heading.

m. Card Group 17. Card Group 17 provides all of the information concerning sources 1 through 16. The parameter DISP is blank (zero) for each source as this run is the initial entry of these sources and there is no input tape. The parameter TYPE identifies the type of source ("0" = stack "1" = volume, "2" = area) and QFLG specifies how the source emissions vary. The emissions from Sources 1 through 11 vary with wind-speed category and stability category, while the emissions from Sources 12 through 16 are assumed constant. Card Group 17 also gives the location, height, exit temperature, and exit velocity or dimensions (depending on the source type), inner diameter of the stack, and the height and width of the building for the consideration of wake effects for stack emissions. As we are calculating particulate concentrations, the parameter NVS has been set to the number (6) of particulate size categories used to define the particulate distributions of Sources 1 through 11. However, the particulate emissions from Sources 12 through 16 are assumed to have negligible gravitational settling velocities and are treated as gaseous emissions. Therefore, for Sources 1 through 11, the particulate settling velocity (VS), mass fraction of the distribution (FRQ) and the surface reflection coefficient for each of the six particulate

size categories must be input. The next six cards for each source, if necessary, specify the emissions of a particular source. There is one card for each stability category with six values across the card for the wind-speed categories. If we were using seasonal data in this example, the program would require NSEASN groups of these cards for Source 1 because QFLG for this source is set to "3." In some cases, the source emissions are blank because the frequency of occurrence of wind-speed and wind-direction is zero.

D.2.2 Example Print Output

Figure D-2 illustrates the printed concentration output for the example hypothetical potash plant. The listing begins by printing the input data under the heading "ISCLT INPUT DATA." This part of the output listing includes all punched data and default values, except source data. Next, the source data are listed under the heading "SOURCE INPUT DATA." Note that the source input data listing also contains warning messages indicating a source is too close to a receptor. Concentrations are not calculated for those source-receptor combinations. The remainder of the output listing in Figure D-2 shows the annual ground-level particulate concentrations due to selected sources, but does not show the complete output listing. The page number of each table in the output listing is shown in the upper right hand corner. For example, pages 12, 13, and 14 (upper right hand corner) show the complete output for Source 1. The heading given is "ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 1." The particulate concentrations calculated for the receptor grid system follow the page heading on page 12 and end at the middle of page 13. The concentrations at the discrete receptors are then printed, followed by the maximum 10 values. The maximum 10 values listed here were derived from Source 1 alone as there were no other sources in this particular source combination. The next

concentration tables illustrated are from pages 15 through 17 of the output listing. These pages give the individual concentrations produced by Source 2 that contribute to the combined Sources 2 through 11. The individual source output is printed because ISW(8) was input as "3." Note that the maximum 10 values for Source 2 on page 16 are actually those 10 receptors from Source 2 that contribute to the maximum 10 values of the combined Sources 2 through 11. Although not shown in Figure D-2, the output listing continues printing tables for Sources 3 through 11 with the same form and content as shown for Source 2 on page 15 through 17. The next concentration tables illustrated are from pages 45 through 47 of the output listing. These pages show the combined particulate concentrations for Sources 2 through 11 with the maximum 10 values and receptors for the combined Sources 2 through 11. Figure D-2 continues with output pages 60 through 62 showing the combined source output for Sources 12 through 15. The output for Source 16 is shown on pages 63 through 65. The ISCLT program then continues to print the 10 values from each of Sources 1 through 16 that contribute to the maximum 10 of all 16 sources combined (only Source 2 is shown). The program only displays the 10 values that contribute to the maximum 10 because the calculations for all receptor points for each source have been displayed earlier in the output listing. The output listing for this example is terminated on output page 85 with a summary of the source ID-number and source type of each source output to tape with the respective calculated concentrations.

D.3 Example Dry Deposition Run

This ISCLT program example run calculates the total annual ground-level dry deposition from the same hypothetical potash processing plant described in Section D.2. This particular example is modeled using 11 out of the original

16 sources. Only the first 11 sources are used here because Sources 12 through 16 are assumed to be emitting only submicron particulates that are assumed to be completely reflected at the ground surface and thus do not contribute to the ground-level deposition.

D.3.1 Input Data Set-Up Procedures

The input card data set-up procedure for this example is the same as that used in Section D.2 for the example concentration run and is shown in Figure D-3. However, there are differences between this runstream and the runstream used in the concentration example. The parameters ISW(1) and ISW(5) on Card Group 2 are changed to the values "2" and "1", respectively, indicating deposition is to be calculated and no output tape is used. Card Groups 3 through 4a show the number of input sources (NSOURC), which is reduced to 11, and the number of output source combinations (NGROUP), which is reduced to 3. Also, Card Group 17 shows the new emission rates for Sources 1 through 11 for deposition calculations. The only other change in the input deck is the removal of Card Group 17 for Sources 12 through 16.

D.3.2 Example Print Output

Figure D-4 illustrates a table of printed deposition output for the example hypothetical potash plant. The table shows the annual ground-level deposition in grams per square meter due to Sources 1 through 11 combined and can be used to verify if the model is working correctly.

CARD GROUP	CARD NUMBER	CARD COLUMN
		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
1	1	HYPOTHETICAL POTASH PROCESSING PLANT
2	2	2 2 3 2 3 3 2 2 1 1 1 1 1
3	3	11 3 19 19 1
4	4	1 2 1
4a	5	1 2 -11 -11
5	6	
6	7	-3000 -2000 -1500 -1250 -1000 -800 -600 -400
	8	-200 0 200 400 600 800 1000 1250
	9	1500 2000 3000
7	10	-3000 -2000 -1500 -1250 -1000 -800 -600 -400
	11	-200 0 200 400 600 800 1000 1250
	12	1500 2000 3000
6a 7a	13	2108. 14.
9a	14	.0001695 .0000856 .0000000 .0000000 .0000000 .0000000
	15	.0001283 .0001998 .0000000 .0000000 .0000000 .0000000
	16	.0000918 .0001998 .0000000 .0000000 .0000000 .0000000
	17	.0001076 .0002569 .0000000 .0000000 .0000000 .0000000
	18	.0003119 .0005995 .0000000 .0000000 .0000000 .0000000
	19	.0003611 .0005139 .0000000 .0000000 .0000000 .0000000
	20	.0003865 .0003426 .0000000 .0000000 .0000000 .0000000
	21	.0006953 .0007993 .0000000 .0000000 .0000000 .0000000
	22	.0006747 .0008564 .0000000 .0000000 .0000000 .0000000
	23	.0005512 .0005424 .0000000 .0000000 .0000000 .0000000
	24	.0001441 .0002569 .0000000 .0000000 .0000000 .0000000
	25	.0001155 .0002855 .0000000 .0000000 .0000000 .0000000
	26	.0002899 .0002569 .0000000 .0000000 .0000000 .0000000
	27	.0000839 .0001713 .0000000 .0000000 .0000000 .0000000
	28	.0000602 .0000856 .0000000 .0000000 .0000000 .0000000
	29	.0002820 .0002284 .0000000 .0000000 .0000000 .0000000
	30	.0007353 .0007708 .0005710 .0000000 .0000000 .0000000
	31	.0010488 .0010848 .0004853 .0000000 .0000000 .0000000
	32	.0004444 .0006851 .0001993 .0000000 .0000000 .0000000
	33	.0009629 .0014845 .0008564 .0000000 .0000000 .0000000
	34	.0018775 .0027977 .0016843 .0000000 .0000000 .0000000
	35	.0016892 .0027977 .0027691 .0000000 .0000000 .0000000
	36	.0019770 .0031688 .0034257 .0000000 .0000000 .0000000
	37	.0026238 .0039967 .0042536 .0000000 .0000000 .0000000
	38	.0045918 .0042251 .0028548 .0000000 .0000000 .0000000
	39	.0026274 .0030832 .0010563 .0000000 .0000000 .0000000
	40	.0014567 .0010848 .0006281 .0000000 .0000000 .0000000
	41	.0016527 .0021125 .0007137 .0000000 .0000000 .0000000
	42	.0024999 .0021125 .0011134 .0000000 .0000000 .0000000
	43	.0013425 .0011990 .0007708 .0000000 .0000000 .0000000
	44	.0009151 .0006851 .0004568 .0000000 .0000000 .0000000
	45	.0007325 .0007422 .0003711 .0000000 .0000000 .0000000
	46	.0004645 .0009421 .0012561 .0001427 .0000285 .0000000
	47	.0006990 .0007993 .0015130 .0004853 .0001427 .0000285
	48	.0002668 .0007422 .0009421 .0004282 .0000285 .0000000
	49	.0005317 .0014559 .0015701 .0004282 .0000571 .0000000
	50	.0006882 .0027977 .0058523 .0007137 .0000856 .0000000

Figure D-3. Card input data values for the hypothetical potash processing plant deposition run.

CARD GROUP	CARD NUMBER	CARD COLUMN															
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
	51	.0006961	.0037683	.0069657	.0021125	.0001427	.0000000										
	52	.0005842	.0030546	.0075652	.0031688	.0001713	.0000000										
	53	.0006683	.0042536	.0081076	.0025978	.0001998	.0000000										
	54	.0011771	.0040823	.0051101	.0006281	.0001142	.0000285										
	55	.0007716	.0035399	.0024551	.0002569	.0001142	.0000856										
	56	.0006050	.0016272	.0020269	.0004568	.0000856	.0001427										
	57	.0008245	.0038539	.0028833	.0005139	.0001713	.0003426										
	58	.0014135	.0043964	.0059665	.0011134	.0002855	.0003426										
	59	.0008536	.0021125	.0033972	.0005139	.0002569	.0002284										
	60	.0003503	.0010563	.0013417	.0001713	.0000571	.0000285										
	61	.0006561	.0010563	.0009421	.0001142	.0000571	.0000000										
	62	.0009550	.0025978	.0079077	.0136744	.0112764	.0102772										
	63	.0006897	.0027406	.0083784	.0134745	.0080790	.0050530										
	64	.0003904	.0016843	.0065945	.0055383	.0020554	.0005424										
	65	.0008485	.0040323	.0086214	.0061663	.0011419	.0001998										
	66	.0019828	.0061949	.0149019	.0124754	.0019412	.0002284										
	67	.0013385	.0053304	.0166143	.0184133	.0030259	.0004853										
	68	.0007174	.0035399	.0090782	.0119044	.0017129	.0001998										
	69	.0009847	.0034257	.0065945	.0070228	.0011990	.0002569										
	70	.0010097	.0037683	.0046818	.0045105	.0012561	.0006281										
	71	.0005797	.0029119	.0021411	.0034257	.0013132	.0004853										
	72	.0004980	.0013703	.0022553	.0034543	.0019983	.0012561										
	73	.0005398	.0017985	.0050530	.0058809	.0028545	.0020340										
	74	.0012231	.0045962	.0091353	.0148448	.0079077	.0057667										
	75	.0006990	.0020269	.0074224	.0141597	.0106198	.0065945										
	76	.0005355	.0018842	.0051101	.0075937	.0029404	.0019412										
	77	.0007403	.0021696	.0065374	.0055934	.0026264	.0015987										
	78	.0000000	.0052528	.0095064	.0000000	.0000000	.0000000										
	79	.0000000	.0032544	.0076794	.0000000	.0000000	.0000000										
	80	.0000000	.0017700	.0057096	.0000000	.0000000	.0000000										
	81	.0000000	.0033686	.0075937	.0000000	.0000000	.0000000										
	82	.0000000	.0049673	.0097062	.0000000	.0000000	.0000000										
	83	.0000000	.0027406	.0056239	.0000000	.0000000	.0000000										
	84	.0000000	.0017700	.0027406	.0000000	.0000000	.0000000										
	85	.0000000	.0023695	.0018271	.0000000	.0000000	.0000000										
	86	.0000000	.0024551	.0015701	.0000000	.0000000	.0000000										
	87	.0000000	.0018271	.0013132	.0000000	.0000000	.0000000										
	88	.0000000	.0016558	.0019983	.0000000	.0000000	.0000000										
	89	.0000000	.0034257	.0055383	.0000000	.0000000	.0000000										
	90	.0000000	.0066802	.0111622	.0000000	.0000000	.0000000										
	91	.0000000	.0049959	.0070228	.0000000	.0000000	.0000000										
	92	.0000000	.0035685	.0063091	.0000000	.0000000	.0000000										
	93	.0000000	.0052242	.0089925	.0000000	.0000000	.0000000										
	94	.0068412	.0097348	.0000000	.0000000	.0000000	.0000000										
	95	.0037307	.0055954	.0000000	.0000000	.0000000	.0000000										
	96	.0024779	.0043107	.0000000	.0000000	.0000000	.0000000										
	97	.0029384	.0049388	.0000000	.0000000	.0000000	.0000000										
	98	.0047532	.0077364	.0000000	.0000000	.0000000	.0000000										
	99	.0030647	.0049102	.0000000	.0000000	.0000000	.0000000										
	100	.0032044	.0028262	.0000000	.0000000	.0000000	.0000000										
	101	.0035623	.0023695	.0000000	.0000000	.0000000	.0000000										
	102	.0047073	.0031688	.0000000	.0000000	.0000000	.0000000										
	103	.0048615	.0041680	.0000000	.0000000	.0000000	.0000000										
	104	.0029674	.0034257	.0000000	.0000000	.0000000	.0000000										
	105	.0059074	.0094493	.0000000	.0000000	.0000000	.0000000										
	106	.0117078	.0205544	.0000000	.0000000	.0000000	.0000000										
	107	.0074288	.0120472	.0000000	.0000000	.0000000	.0000000										

Figure D-3. (Continued)

CARD GROUP	CARD NUMBER	CARD COLUMN																			
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80				
	108	.0062942		.0098204		.0000000		.0000000		.0000000		.0000000									
	109	.0076137		.0128160		.0000000		.0000000		.0000000		.0000000									
10	110	287.2		287.2		283.2		280.8		279.1		279.1									
11	111	1730		1730																	
	112	1730		1730		1730															
	113	960		1025		1235		1295		1295		1295									
	114	320		500		840		840		840		840									
	115																				
	116																				
12	117																				
	118																				
	119																				
	120																				
	121																				
	122																				
13	123																				
14	124																				
15	125																				
	126																				
16	127																				
	128																				
	129																				
	130																				
	131																				
	132																				
17	133	1 23		-13.3		-13.3		10		26.6								6			
	134	.001		.007		.019		.037		.061		.099									
	135	.10		.40		.28		.12		.06		.04									
	136	1.0		.82		.72		.65		.59		.50									
	137	1.26E7		1.58E7																	
	138	9.46E6		1.26E7		1.58E7															
	139	6.31E6		9.46E6		1.26E7		1.58E7		2.21E7		3.15E7									
	140	3.15E7		7.88E6		1.26E7		1.58E7		2.21E7		3.15E7									
	141			6.31E6		9.46E6															
	142	1.58E6		3.15E6																	
	143	2 13		20		0		.9		4.7		1.0						6			
	144	.001		.007		.019		.037		.061		.099									
	145	.10		.40		.28		.12		.06		.04									
	146	1.0		.82		.72		.65		.59		.50									
	147	4.10E6		5.05E6																	
	148	3.15E6		4.10E6		5.05E6															
	149	2.52E6		3.78E6		4.42E6		5.05E6		5.99E6		6.94E6									
	150	1.26E6		3.15E6		4.10E6		5.05E6		5.99E6		6.94E6									
	151			2.52E6		3.15E6															
	152	6.31E5		1.58E6																	
	153	3 13		30		0		2.6		4.7		1.0						6			
	154	.001		.007		.019		.037		.061		.099									
	155	.10		.40		.28		.12		.06		.04									
	156	1.0		.82		.72		.65		.59		.50									
	157	4.10E6		5.05E6																	
	158	3.15E6		4.10E6		5.05E6															
	159	2.52E6		3.78E6		4.42E6		5.05E6		5.99E6		6.94E6									
	160	1.26E6		3.15E6		4.10E6		5.05E6		5.99E6		6.94E6									
	161			2.52E6		3.15E6															
	162	6.31E5		1.58E6																	
	163	4 13		40		0		4.3		4.7		1.0						6			
	164	.001		.007		.019		.037		.061		.099									

Figure D-3. (Continued)

CARD GROUP	CARD NUMBER	CARD COLUMN															
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
	165		.10		.40		.28		.12		.06		.04				
	166		1.0		.82		.72		.65		.59		.50				
	167		4.10E6		5.05E6												
	168		3.15E6		4.10E6		5.05E6										
	169		2.52E6		3.78E6		4.42E6		5.05E6		5.99E6		6.94E6				
	170		1.26E6		3.15E6		4.10E6		5.05E6		5.99E6		6.94E6				
	171				2.52E6		3.15E6										
	172		6.31E5		1.58E6												
	173		5 13		49		0		6.1		4.7		1.0				6
	174		.001		.007		.019		.037		.061		.099				
	175		.10		.40		.28		.12		.06		.04				
	176		1.0		.82		.72		.65		.59		.50				
	177		4.10E6		5.05E6												
	178		3.15E6		4.10E6		5.05E6										
	179		2.52E6		3.78E6		4.42E6		5.05E6		5.99E6		6.94E6				
	180		1.26E6		3.15E6		4.10E6		5.05E6		5.99E6		6.94E6				
	181				2.52E6		3.15E6										
	182		6.31E5		1.58E6												
	183		6 13		59		0		7.8		4.7		1.0				6
	184		.001		.007		.019		.037		.061		.099				
	185		.10		.40		.28		.12		.06		.04				
	186		1.0		.82		.72		.65		.59		.50				
	187		4.10E6		5.05E6												
	188		3.15E6		4.10E6		5.05E6										
	189		2.52E6		3.78E6		4.42E6		5.05E6		5.99E6		6.94E6				
	190		1.26E6		3.15E6		4.10E6		5.05E6		5.99E6		6.94E6				
	191				2.52E6		3.15E6										
	192		6.31E5		1.58E6												
	193		7 13		69		0		9.6		4.7		1.0				6
	194		.001		.007		.019		.037		.061		.099				
	195		.10		.40		.28		.12		.06		.04				
	196		1.0		.82		.72		.65		.59		.50				
	197		4.10E6		5.05E6												
	198		3.15E6		4.10E6		5.05E6										
	199		2.52E6		3.78E6		4.42E6		5.05E6		5.99E6		6.94E6				
	200		1.26E6		3.15E6		4.10E6		5.05E6		5.99E6		6.94E6				
	201				2.52E6		3.15E6										
	202		6.31E5		1.58E6												
	203		8 13		79		0		11.3		4.7		1.0				6
	204		.001		.007		.019		.037		.061		.099				
	205		.10		.40		.28		.12		.06		.04				
	206		1.0		.82		.72		.65		.59		.50				
	207		4.10E6		5.05E6												
	208		3.15E6		4.10E6		5.05E6										
	209		2.52E6		3.78E6		4.42E6		5.05E6		5.99E6		6.94E6				
	210		1.26E6		3.15E6		4.10E6		5.05E6		5.99E6		6.94E6				
	211				2.52E6		3.15E6										
	212		6.31E5		1.58E6												
	213		9 13		89		0		13.0		4.7		1.0				6
	214		.001		.007		.019		.037		.061		.099				
	215		.10		.40		.28		.12		.06		.04				
	216		1.0		.82		.72		.65		.59		.50				
	217		4.10E6		5.05E6												
	218		3.15E6		4.10E6		5.05E6										
	219		2.52E6		3.78E6		4.42E6		5.05E6		5.99E6		6.94E6				
	220		1.26E6		3.15E6		4.10E6		5.05E6		5.99E6		6.94E6				
	221				2.52E6		3.15E6										

Figure D-3. (Continued)

CARD GROUP	CARD NUMBER	CARD COLUMN															
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
	222	6.31E5		1.58E6													
	223	10 13		99		0	14.8			4.7		1.0					6
	224	.001		.007		.019		.037		.061		.099					
	225	.10		.40		.28		.12		.06		.04					
	226	1.0		.82		.72		.65		.59		.50					
	227	4.10E6		5.05E6													
	228	3.15E6		4.10E6		5.05E6											
	229	2.52E6		3.78E5		4.42E5		5.05E6		5.99E6		6.94E6					
	230	1.26E6		3.15E6		4.10E6		5.05E6		5.99E6		6.94E6					
	231			2.52E6		3.15E6											
	232	6.31E5		1.58E6													
	233	11 13		109		0	16.5			4.7		1.0					6
	234	.001		.007		.019		.037		.061		.099					
	235	.10		.40		.28		.12		.06		.04					
	236	1.0		.82		.72		.65		.59		.50					
	237	4.10E6		5.05E6													
	238	3.15E6		4.10E6		5.05E6											
	239	2.52E6		3.78E6		4.42E5		5.05E6		5.99E6		6.94E6					
	240	1.26E6		3.15E6		4.10E6		5.05E6		5.99E6		6.94E6					
	241			2.52E6		3.15E6											
	242	6.31E5		1.58E6													

Figure D-3. (Continued)

Figure D-4. Total Annual Particulate Deposition Output Listing.

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** ANNUAL GROUND LEVEL DEPOSITION (GRAMS PER SQUARE METER) FROM COMBINED SOURCES -11,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-3000.000	-2000.000	-1500.000	-1250.000	-1000.000	-800.000	-600.000	-400.000	-200.000
				- DEPOSITION -					
3000.000	1.134221	1.639463	1.937078	2.107609	2.143732	2.184174	2.211250	2.214312	2.215422
2000.000	1.937597	2.587110	3.221557	3.601634	3.945059	4.133438	4.222740	4.266389	4.241170
1500.000	2.515018	3.859255	4.757793	5.265565	6.016244	6.548946	6.933612	7.159320	7.245927
1250.000	2.885484	4.750210	6.158155	7.051591	8.005323	9.200049	10.259617	10.953939	11.403341
1000.000	3.015925	5.790971	8.198109	9.824675	12.049610	13.835477	16.617570	19.191376	20.017103
800.000	3.118665	6.723281	10.227020	13.116776	17.001598	21.330920	25.851764	32.192329	35.950378
600.000	3.198263	7.139009	12.711740	17.176039	24.386861	33.110780	46.369599	59.624344	73.339372
400.000	3.231824	7.452122	13.763298	20.772664	34.658698	51.383995	81.345732	136.762327	191.922672
200.000	3.260319	7.604123	14.439153	22.418664	38.549571	67.598528	133.722347	291.315071	770.843849
.000	3.295774	7.728414	14.785757	23.183982	40.974732	73.345537	154.204071	419.569622	1845.328690
-200.000	3.021260	6.663865	12.083995	18.131350	29.459642	48.706669	86.985412	160.860039	538.879028
-400.000	2.747118	5.751460	9.745962	13.718080	20.545333	29.059140	47.648258	97.087451	255.922882
-600.000	2.474773	4.793650	7.463009	9.789230	14.324012	20.115365	32.932199	68.051999	140.046497
-800.000	2.187730	3.831306	5.917305	7.848523	10.615602	15.115999	26.844012	46.936771	75.144969
-1000.000	1.904801	3.277030	4.930394	6.180081	8.567480	13.443414	21.298683	34.190131	44.343476
-1250.000	1.585251	2.782912	3.881238	4.961629	7.796925	11.327117	15.941791	21.839235	26.311772
-1500.000	1.392180	2.339124	3.275689	4.708634	6.920204	9.234411	12.513065	15.002647	17.278957
-2000.000	1.118999	1.719941	2.996098	3.945747	5.113114	6.347174	7.279683	8.167460	8.924505
-3000.000	.727015	1.483816	2.078208	2.481909	2.763994	2.990905	3.204907	3.388955	3.557447

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	.000	200.000	400.000	600.000	800.000	1000.000	1250.000	1500.000	2000.000
				- DEPOSITION -					
3000.000	2.211638	2.047780	1.926208	1.805635	1.676092	1.546493	1.401486	1.236462	.980173
2000.000	4.239700	3.769505	3.426651	3.068564	2.724039	2.427032	2.118193	1.817195	1.355867
1500.000	7.188654	6.142247	5.276752	4.428219	3.827579	3.370878	2.819301	2.468155	2.121625
1250.000	11.362197	9.374614	7.628834	6.045898	5.129163	4.268091	3.629981	3.317267	2.684304
1000.000	20.446176	15.862835	12.209504	9.346117	7.350258	6.192192	5.349532	4.620741	3.364506
800.000	37.232875	26.919234	18.648608	13.905805	10.981743	9.264294	7.477946	5.971407	4.298681
600.000	80.245540	50.712444	32.594069	23.934010	18.343005	14.069438	10.215782	8.380687	5.695859
400.000	227.641615	108.585246	70.870919	45.832468	30.395885	23.410457	16.581286	12.101673	7.181598
200.000	1099.698090	396.199959	168.505270	106.849947	62.288439	38.227509	23.876318	16.029036	8.652845
.000	66.446947	2332.215515	562.934990	211.284319	101.501408	57.044015	32.068347	20.421163	10.279062
-200.000	2150.378540	691.020302	312.472935	161.415503	84.747926	49.291997	29.021493	18.872555	9.701679
-400.000	526.946770	197.174313	128.624983	85.196825	57.083517	40.271049	25.078926	16.940746	9.064738
-600.000	199.108976	108.585233	60.900404	44.144599	34.178925	26.272262	19.202941	14.666088	8.252060
-800.000	96.021443	62.343819	35.959193	26.243457	20.353180	17.269755	14.025793	11.155712	7.359030
-1000.000	54.079618	38.520713	25.258704	18.061436	13.948326	11.551953	9.969604	8.535183	6.043626
-1250.000	30.300152	23.453363	17.121252	12.005635	9.963830	8.086905	6.614571	5.967364	4.732408
-1500.000	19.362919	15.699401	12.317631	9.088348	7.326366	6.250738	5.024605	4.272190	3.646432
-2000.000	9.675628	8.328859	7.133207	5.894278	4.709229	4.018550	3.459508	2.932448	2.156350
-3000.000	3.739484	3.416272	3.135168	2.851264	2.550874	2.251947	1.914329	1.689826	1.357427

Figure D-4. (Continued).

** ANNUAL GROUND LEVEL DEPOSITION (GRAMS PER SQUARE METER) (CONT.) FROM COMBINED SOURCES -11,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE 3000.000 , METERS)	- DEPOSITION -
3000.000	.597871
2000.000	1.065438
1500.000	1.420439
1250.000	1.684143
1000.000	2.126221
800.000	2.510407
600.000	2.904970
400.000	3.291805
200.000	3.676092
.000	4.070621
-200.000	3.910680
-400.000	3.751918
-600.000	3.571520
-800.000	3.356034
-1000.000	3.123007
-1250.000	2.833049
-1500.000	2.389837
-2000.000	1.725906
-3000.000	.865388

- DISCRETE RECEPTORS -

X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	DEPOSITION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	DEPOSITION	X RANGE (METERS)	Y AZIMUTH BEARING (DEGREES)	DEPOSITION
2108.0	14.0	3.144266						

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	DEPOSITION
200.00	.00	2332.215515
.00	-200.00	2150.378540
-200.00	.00	1845.328690
.00	200.00	1099.693090
-200.00	200.00	770.843849
200.00	-200.00	691.020302
400.00	.00	562.934990
-200.00	-200.00	538.879028
.00	-400.00	526.946770

Figure D-4. (Continued).

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 **   ANNUAL GROUND LEVEL DEPOSITION ( GRAMS PER SQUARE METER                ) (CONT.) FROM COMBINED SOURCES    -11,

                                    - PROGRAM DETERMINED MAXIMUM 10 VALUES -

                                        X            Y          DEPOSITION
                                    COORDINATE   COORDINATE

                                     (METERS)     (METERS )
                                    ---------------------------------------
                                       -400.00          .00      419.569622
```

APPENDIX E

LOGIC FLOW DESCRIPTION OF THE ISC SHORT-TERM MODEL (ISCST) COMPUTER PROGRAM

The ISCST program is composed of a main program (ISCST), fifteen subroutines (INCHK, MODEL, DYOUT, MAXOT, MAX50, VERT, SIGMAZ, URBNYZ, XVY, XVZ, URBBAR, NMCALM, AVCALM, MPR1, AND ERFX) and a BLOCK DATA subprogram (BLOCK). The source codes for all of these routines are listed in Appendix A and Figure E-1 shows the subroutine calling sequence.

The main routine (ISCST) of the program is responsible for clearing (setting all values to zero) all data storage, reading the necessary input parameters in order to compute the required data storage* for a problem run and printing an error message if the computed data storage exceeds the allocated data storage. Assuming that no error is found in computing the required data storage, this routine calls subroutine INCHK which reads the remaining input parameters (except for the hourly meteorological data), provides program default values when necessary and prints all input parameters when desired by the user. Finally, the main routine, upon a return from subroutine INCHK, calls subroutine MODEL which reads the hourly meteorological data, performs all concentration or deposition calculations and controls all output. A successful return from subroutine MODEL allows the main program to normally terminate the run.

Subroutine INCHK reads receptor location data, source group data, meteorological-related constants data, identification labels, model constants, and source data. Default values are provided by the program for all input parameters when necessary. This subroutine will print error messages and

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*Consult Section 3.2.3.a for a discussion of required data storage computations.

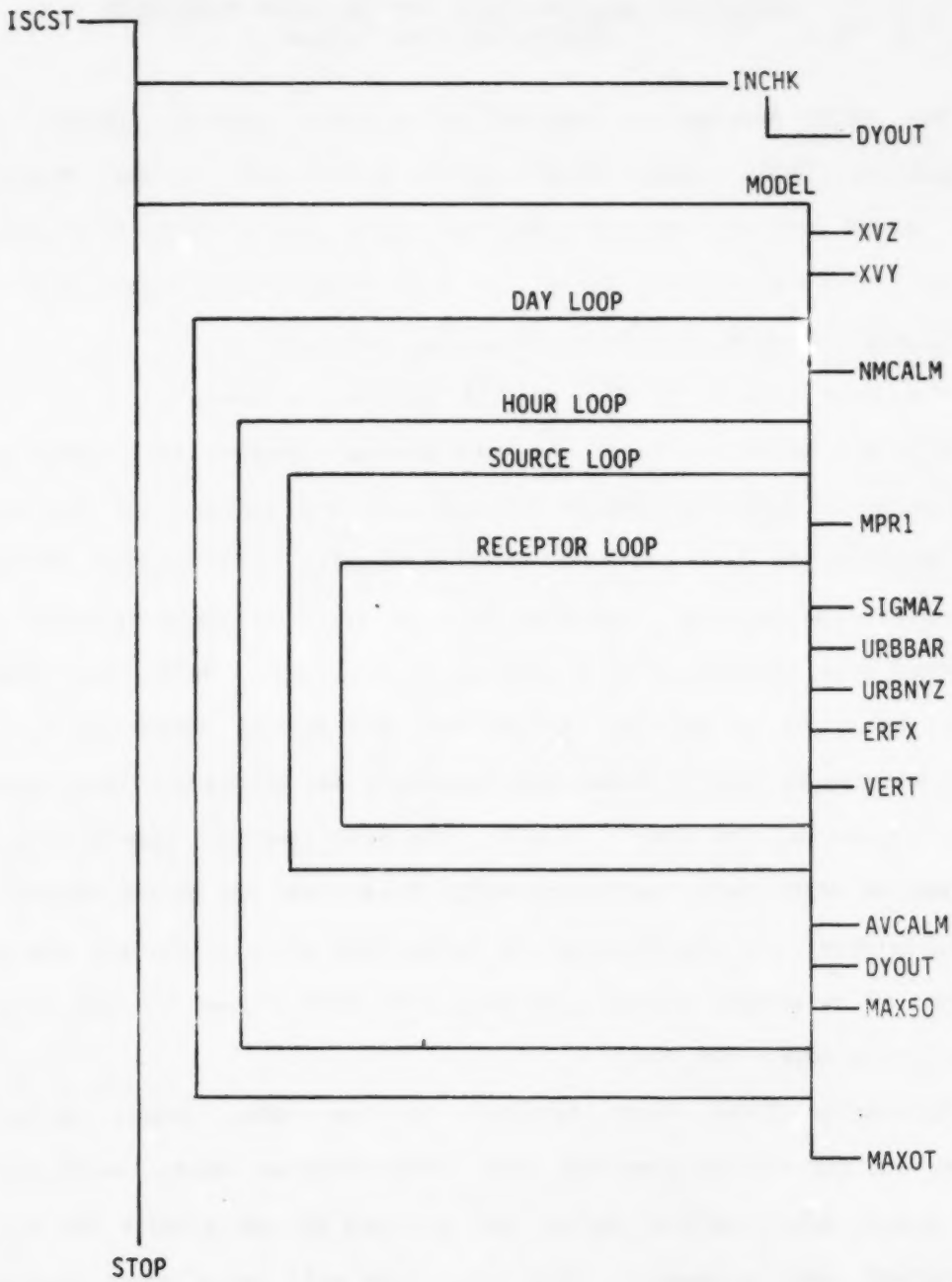


Figure E-1. ISCST Structure and Subroutines

terminate the run when the number of sources to be processed equals zero and when either the values of the surface or upper air station number and years specified by the user do not match the corresponding information read from the hourly meteorological data tape. This subroutine will then print all input data parameters if desired by the user. The INCHK subroutine then returns to the calling routine (ISCST) provided no errors were detected.

Subroutine MODEL is the principal section of the ISCST program. Its main functions are reading the hourly meteorological data, performing all concentration or deposition calculations and controlling the output related to calculated concentration or deposition values. First, if Urban Mode 3 is selected, subroutines XVY and XVZ are called to compute lateral (X_y) and vertical (X_z) virtual distances, respectively for all source, stability category, and downwind distance combinations. If Urban Mode 3 is not selected X_y and X_z are computed in subroutine MODEL. Next, the subroutine searches for all source-receptor distances less than one meter or the greater of three building heights or three building widths. A diagnostic table identifying the aforementioned source-receptor combinations is printed. The subroutine then begins a loop over all days of meteorological data and reads a day of data from either tape or card. A second loop is begun over the hours of meteorological data followed by a third loop over all sources. For stack-type sources, subroutine MPR1 is called to calculate plume rise independent of source-receptor orientation. Next, a loop over all receptors is begun. In this portion of the subroutine, all information has been collected in order to calculate the terms used to make a concentration or deposition computation at a given receptor from a given source for an hour of meteorological data. The program first computes the downwind (x) and crosswind (y) distances. For stack-type sources, the subroutine then completes the remaining plume rise calculations if they are dependent on source-receptor orientation. Next, if

Urban Mode 3 is selected, subroutine URBBAR is called to calculate the downwind distance index and $\bar{b}$ (if deposition is considered). Then subroutine URBNYZ is called to calculate the lateral (σ_y) and vertical (σ_z) dispersion coefficients as a function of downwind distance and stability category. If Urban Mode 3 is not selected, subroutine SIGMAZ is called to compute the downwind distance index, σ_z, and $\bar{b}$ (if deposition is considered), and σ_y is computed in the subroutine MODEL. Finally, concentration or deposition is calculated for this source- receptor combination for a given hour of meteorological data. Subroutine ERFX is called to compute the error function values for area-type sources. Subroutine VERT aids in calculating the Vertical Term for calculations of concentration or deposition requiring a Vertical Term value. As the subroutine loops over all receptors, the calculated concentration or deposition values are stored into an array (CALC). After all receptors are processed for this source and hour, the array of values (CALC) are stored or summed into portions of another array (CHIAV) depending on source group combinations desired by the user. After all sources are processed for a given hour, portions of the CHIAV array are stored or summed into other arrays depending on the source group combination. For each hour and appropriate combination of user-defined time intervals, the subroutine calculates averages (for concentration) or sum totals (for deposition) of values in portions of the CHIAV array. Portions of array CHIAV are then used by the subroutine DYOUT to print tables, write to the output tape, store for "N"-day summations, search for highest and second-highest values at each receptor and search for the maximum 50 calculated values. After looping over all hours and days of meteorological data, MODEL calls subroutine DYOUT to optionally print tables or write to tape "N"-day average concentration or total deposition values and tables of the highest and second-highest average concentration or total deposition.

Subroutine MAXOT is called to optionally print tables of the maximum 50 average concentration or total deposition values. Upon normal processing of MODEL, a return is made to the ISCST routine.

Subroutine DYOUT prints out different types of tables related to all receptor points. Depending on a flag variable, subroutine DYOUT prints the terrain elevations for all receptors, the average concentration or total deposition values for all receptors for a given time interval and source group combination for a given day, and the highest or second-highest average concentration or total deposition values for all receptors for a given time interval and source group combination.

The remaining subroutines which make up the ISCST program have the following functions. Subroutine MAXOT lists the maximum 50 average concentration or total deposition values calculated for the problem. Subroutine MAX50 searches for and stores the maximum 50 average concentration or total deposition values for a given time interval and source group combination. Subroutine VERT aids in computing the Vertical Term when required in calculating concentration or deposition. Subroutine SIGMAZ is called only if Urban Mode 3 is not selected, and has three functions. Depending on a flag variable, this subroutine computes a downwind distance index used for accessing arrays containing virtual distances or arrays of constants related to calculating the vertical (σ_z) and horizontal (σ_y) dispersion coefficients. The second function is to calculate σ_z. The last function is to compute the average exponent ($\bar{b}$), for the interval between the source and the downwind distance (x), which is used for deposition calculations. Subroutine URBNYZ uses the (Briggs, 1974) curves of urban dispersion coefficients derived from the (McElroy-Pooler, 1968) dispersion rates to compute the lateral (σ_y) and vertical (σ_z) virtual distances as a function of downwind distance and stability category. This subroutine is

only called when Urban Mode 3 is selected. Subroutines XVY and XVZ compute lateral (X_y) and vertical (X_z) virtual distances, respectively, for all source, stability category, and downwind distance categories. Similarly, these subroutines are only called if Urban Mode 3 is selected. Subroutine URBBAR is also called only when Urban Mode 3 is selected. Depending on a flag variable this routine calculates either the downwind distance index used in the σ_z and σ_y computations, or the average exponent ($\bar{b}$) used for deposition calculations. Subroutine NMCALM determines the number of calm hours for each averaging period per day. This subroutine is called only if the user desires calm wind processing. Subroutine AVCALM is used in conjunction with subroutine NMCALM to determine the divisor used for averaging concentration or deposition results for averaging periods which had calm hours. Subroutine MPR1 calculates plume rise independent of source-receptor orientation, in a manner consistent with the MPTER model. Subroutine ERFX computes the value of the error function terms for area-type sources.

APPENDIX F

LOGIC FLOW DESCRIPTION OF THE ISC LONG-TERM MODEL (ISCLT) COMPUTER PROGRAM

The ISCLT computer program consists of a main program (ISCLT) and 19 subroutines (MODEL, OUTPT, HEADNG, MXIMUM, CHECKR, SUMMER, TITLR, DISTR, FUNCT, VERTC1, VERTC2, VERTC3, SIGMAZ, VIRTZ, VIRTY, URBNYZ, XVY, XVZ, AND MPR1LT.) The FORTRAN source code of these routines is given in Appendix B and the subroutine calling sequence is shown in Figure F-1.

The main routine (ISCLT) of the program is responsible for initializing the program and starting the input data read sequence. This routine reads the problem run title, the program options data and those variables that specify the size (number of values) of required data parameter arrays. The primary function of this routine is to calculate the amount of storage required by the input receptor arrays, elevation array and the concentration or deposition calculation arrays. The program has been designed to store these data in 40,000 words in BLANK COMMON. The program calculates the starting location of each array and passes this information to the main calculation routine (MODEL). The program may use all or part of BLANK COMMON depending on the program options selected. The amount of BLANK COMMON required for a given problem run is calculated by Equation (3-1) in Section 3.2.3.

Subroutine MODEL is the principal processing routine of the ISCLT program. This routine reads the receptor, elevation and meteorological data from input card images or from magnetic tape. The program provides default data values for some variables and begins a loop over all input sources. If a source is a new source from data card, concentration or deposition is calculated using the long-term model equations. If a source is a previous source from an input tape, its concentration or deposition arrays are read from tape. New and/or previous sources and their respective

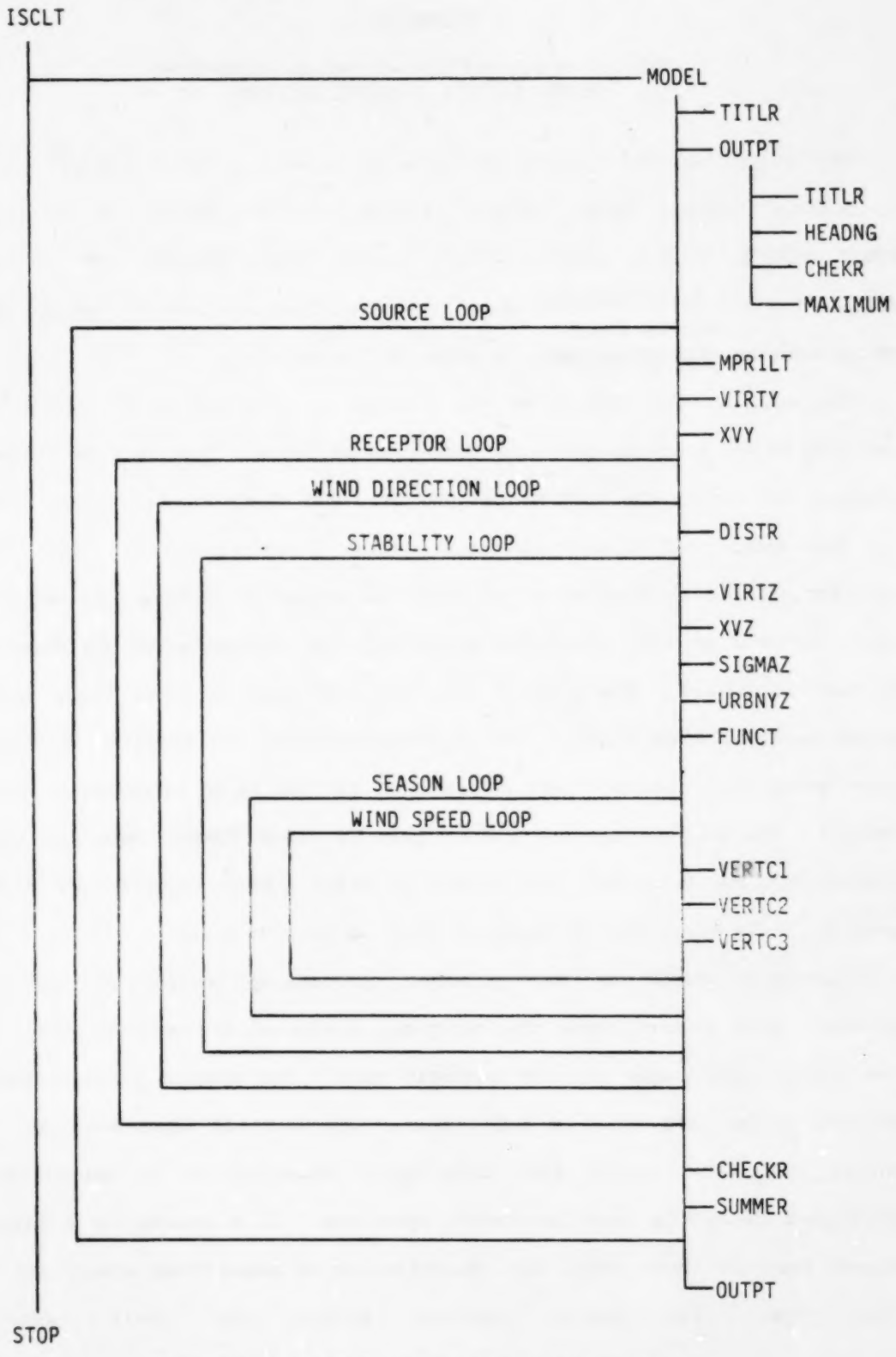


Figure F-1. ISCLT Structure and Subroutines

concentration or deposition arrays are merged into a source/concentration (deposition) inventory of one or more sources for which seasonal and/or annual concentration or deposition values for the individual as well as the combined sources can be output. This routine will also, on option, output all of the program input data including options, receptor arrays, meteorological data, source data and the calculated seasonal concentration or deposition values to tape to be held as a historical file which may be used at a later date to update or to retrieve information not printed when the tape was generated.

Subroutine OUTPT controls the printing of the input source data if this option is chosen. This subroutine also controls the printing of the results of all concentration or deposition calculations and controls the calculations of the maximum 10 concentration or deposition values.

Subroutine HEADNG prints the table headings for the concentration or deposition tables. The headings identify whether seasonal or annual calculations are being printed, whether they are for individual or combined sources and, if combined, which sources are used in the combination. All program output tables are labeled either seasonal or annual. If the user is using monthly data, he/she must remember that season one is actually month one, etc. and an annual label would actually be average monthly or seasonal.

Subroutine TITLR controls the starting of a new output page and writes the problem run title information and page number as the first line of each output page. Also, this subroutine writes the main heading of the input data tables.

Subroutine SUMMER is called by MODEL to sum arrays of concentration or deposition to provide annual (averaged or total) output and to provide combined source output.

Subroutine CHECKR is called by MODEL to determine if a source is part of the current combined sources being summed or if the source is part of any

source combination so the program can decide whether to save it or not when all source calculations are being saved in storage.

Subroutine MXIMUM is called by OUTPT and determines the maximum 10 concentration or deposition values and their respective receptor coordinates for a source or source combination and returns them to subroutine OUTPT.

Subroutine VIRTZ is called by MODEL when the Rural Mode or Urban Mode 1 or 2 is selected. The routine calculates and returns the vertical virtual distance X_z using the Pasquill-Gifford dispersion curves (Turner, 1970).

Subroutine VIRTY is called by MODEL when the Rural Mode or Urban Mode 1 or 2 is selected. The routine calculates the lateral virtual distance X_y using the Pasquill-Gifford dispersion curves (Turner, 1970).

Subroutine XVZ is called by MODEL when Urban Mode 3 is selected and calculates the vertical virtual distance X_z using the (Briggs, 1974) urban dispersion coefficients.

Subroutine XVY is called by MODEL when Urban Mode 3 is selected and calculates the lateral virtual distance X_y using the (Briggs, 1974) urban dispersion coefficients.

Subroutine SIGMAZ is called by MODEL when the Rural Mode or Urban Mode 1 or 2 is selected and calculates the standard deviation of the vertical concentration distribution σ_z. The routine uses the Pasquill-Gifford dispersion curves (Turner, 1970).

Subroutine URBNYZ is called by MODEL when Urban Mode 3 is selected and calculates and returns the standard deviation of the vertical concentration distribution σ_z. This routine uses the (Briggs, 1974) coefficients determined from the (McElroy-Pooler, 1968) rates.

Subroutine MPRILT is called by MODEL for stack sources and calculates the plume rise independent of source-receptor orientation. The algorithm is consistent with the MPTER model.

Subroutine VERTC1 is called by MODEL and calculates and returns the Vertical Term of the concentration equation.

Subroutine VERTC2 is called by MODEL and calculates and returns the Vertical Term for each particulate size category in the calculation of concentration with deposition occurring.

Subroutine VERTC3 is called by MODEL and calculates and returns the Vertical Term for each particulate size category used in the deposition equation.

Function FUNCT is called by MODEL and calculates and returns the average value $\bar{b}$ of the coefficient b which is the exponent used in the σ_z equation. This value is used in the deposition calculations.

Subroutine DISTR is called by MODEL and calculates and returns the distance between the source and receptor if the receptor is within the required calculation sector and calculates the smoothing term $S\{\theta\}$ of the concentration or deposition equation. Subroutine DISTR returns $S\{\theta\}/r\Delta\theta$ or returns a "-1" if the receptor point is outside of the calculation sector downwind of the source.

APPENDIX G

CODING FORMS FOR CARD INPUT TO THE ISC SHORT-TERM MODEL (ISCST) COMPUTER PROGRAM

This appendix contains blank coding forms used for entering input card data for the ISC short-term (ISCST) program. The card group numbers and input data parameter names correspond to those used in Section 3.2.3.a. The solid vertical lines on the coding forms define the column fields for a particular input parameter and the "x"ed areas indicate where data are ignored by the program. The coding forms are presented in the same order as the program expects the input data except for the source data coding forms. The program expects card numbers 2 through 4 to immediately follow card number 1 of Card Group 6 when applicable (NVS is greater than zero). However, it is much easier to enter the source data as presented here.

ISCST INPUT DATA CODING FORM

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER

DATA CARD COLUMN

CONTROL DATA PARAMETER AND VALUE (X means do not punch)

- TITLE -

1 -

- ISW -

2,1 - ISW(1) ISW(2) ISW(3) ISW(4) ISW(5) ISW(6) ISW(7) ISW(8) ISW(9) ISW(10) ISW(11) ISW(12) ISW(13) ISW(14) ISW(15) ISW(16) ISW(17) ISW(18) ISW(19) ISW(20) ISW(21) ISW(22) ISW(23) ISW(24) ISW(25) ISW(26) ISW(27) ISW(28) ISW(29) ISW(30)

2,2 - NSOURC NXPNTS NYPNTS NXWYPT NGROUP IPERD NHOURS NDAYS

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER | DATA CARD COLUMN

RECEPTOR DATA PARAMETER AND VALUE

- GRIDX (axis of grid system, omit if NXPNTS OR NYPNTS = 0) -

3,1 -

- GRIDY (axis of grid system, omit if NXPNTS or NYPNTS = 0) -

3,2 -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE

SHEET OF

CARD GROUP, CARD NUMBER	DATA CARD COLUMN 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 RECEPTOR DATA PARAMETER AND VALUE

- GRIDZ (grid system receptor elevations, omit if ISW(4) = 0) -

3,3 -

3,4 - - XDIS, YDIS, GRIDZ (discrete receptors, omit if NXWYPTS = 0) -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

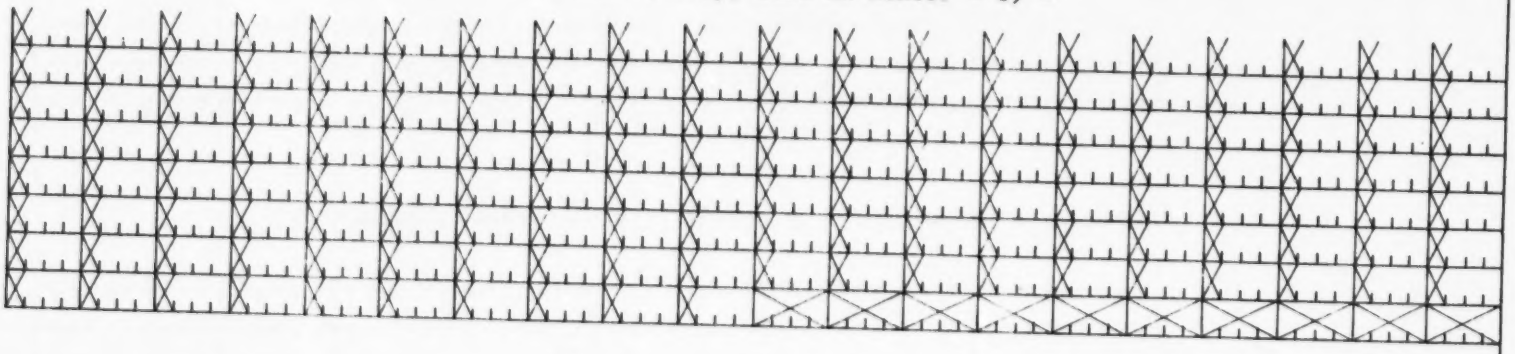
CARD GROUP, CARD NAME

DATA CARD COLUMN

SOURCE GROUP DATA PARAMETER AND VALUE (X means do not punch)

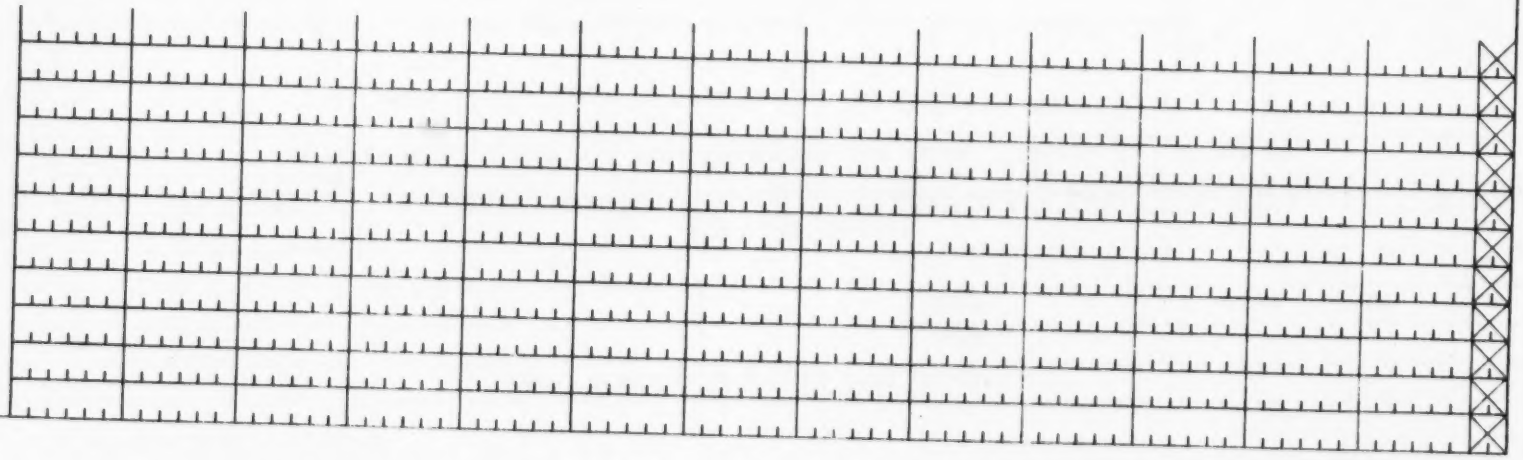
- NSOGRP (array, omit if NGROUP = 0) -

4,1 -



- IDSOR (array, omit if NGROUP = 0) -

4,2 -



ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER	DATA CARD COLUMN
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
	METEOROLOGICAL CONSTANTS DATA PARAMETER AND VALUE (X means do not punch)

- PDEF (array, omit if ISW(21) ≠ 2 or ISW(28) = 1) -

5,1-6 -

- DTHDEF (array, omit if ISW(22) ≠ 2 or ISW(28) = 1) -

5,7-12 -

ZR - UCATS (array) -

5,13 -

PROJECT

ISCST INPUT DATA CODING FORM (Continued)

NAME

DATE

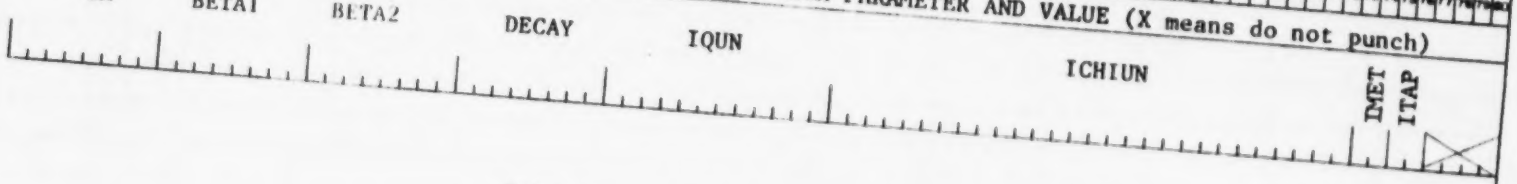
SHEET OF

CARD GROUP, CARD NUMBER

DATA CARD COLUMN

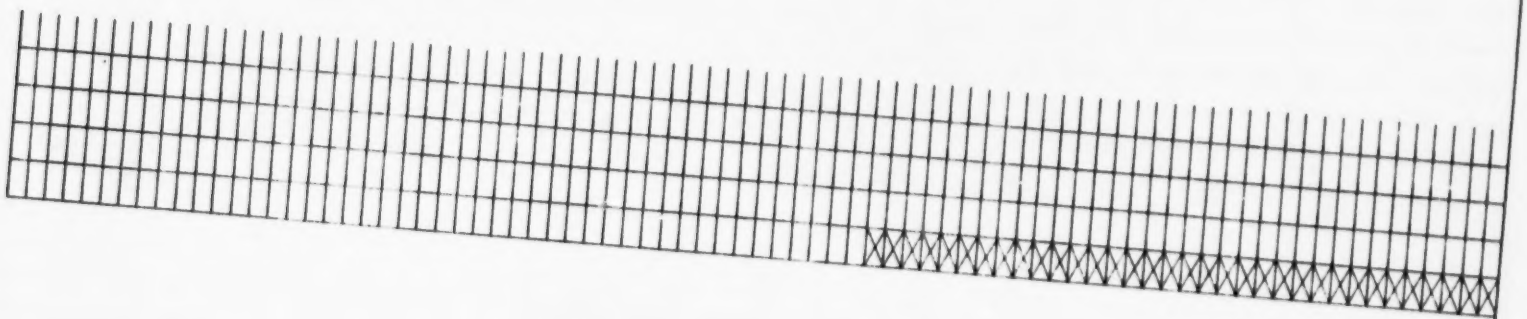
METEOROLOGICAL CONSTANTS AND IDENTIFICATION LABEL DATA PARAMETER AND VALUE (X means do not punch)

5,14 -



- IDAY (array, omit if ISW(19) = 2) -

5,15-19 -



- (omit if ISW(19) = 2) -

5,20 -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER

DATA CARD COLUMN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

SOURCE DATA PARAMETER AND VALUE

6,1 -

NSO	ITYPE	WAKE	NVS	QFLG	Q	XS	YS	ZS	HS	TS	VS	D	HB	HL	HW

C-8

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER	DATA CARD COLUMN 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 SOURCE DATA PARAMETER AND VALUE
6,2 -	- PHI (array, omit if NVS = 0 for all sources) -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE

SHEET OF

DATA CARD COLUMN

CARD GROUP, CARD NUMBER

SOURCE DATA PARAMETER AND VALUE

- VSN (array, omit if NVS = 0 for all sources) -

6,3 -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER	DATA CARD COLUMN
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
	SOURCE DATA PARAMETER AND VALUE
	- GAMMA (array, omit if NVS = 0 for all sources) -
6,4 -	

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER

DATA CARD COLUMN

SOURCE DATA PARAMETER AND VALUE

- QTK (array, omit if ISW(23) = 0 and QFLG = 0 for all sources) -

6,5 -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

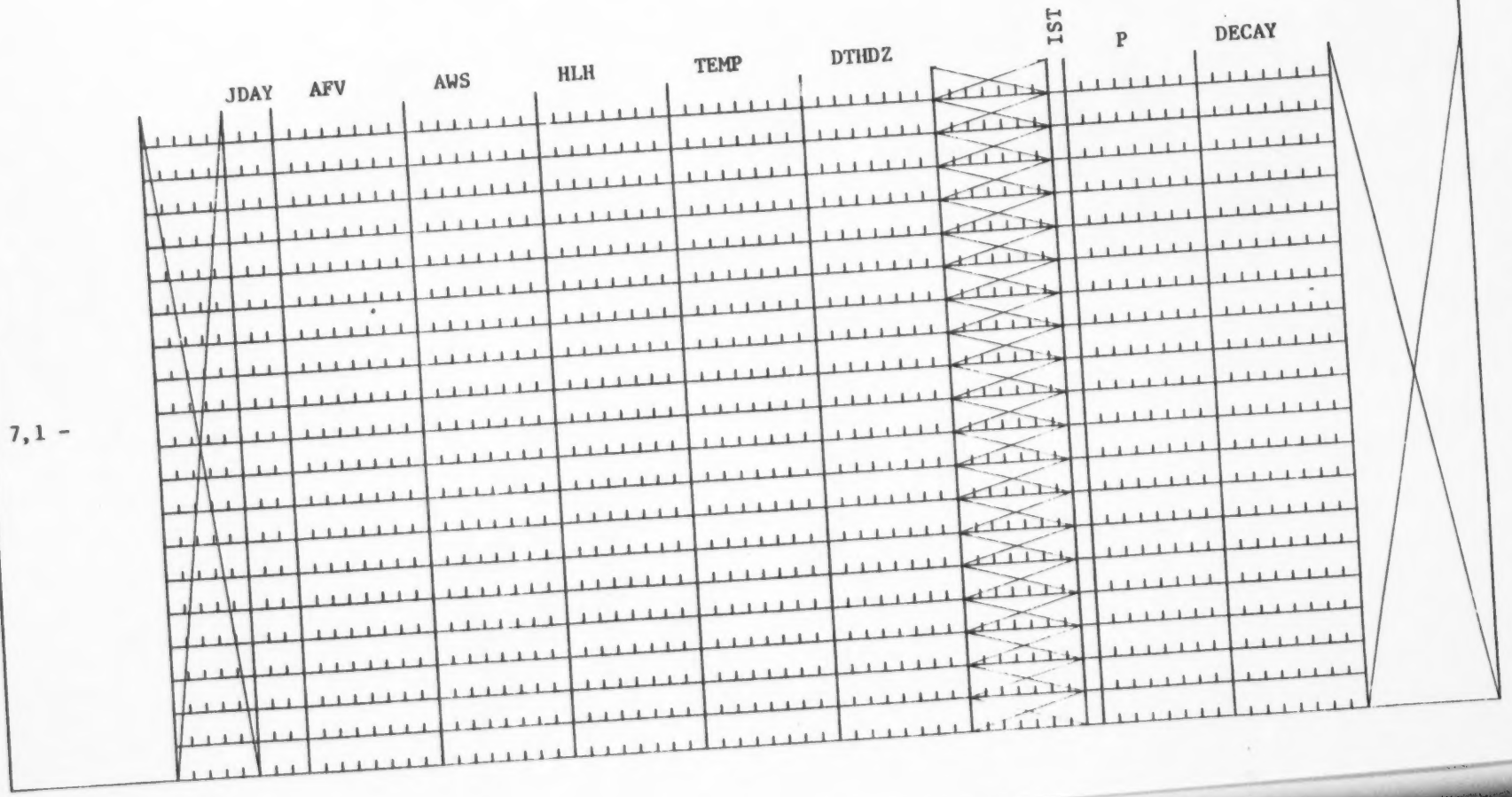
CARD GROUP, CARD NUMBER

DATA CARD COLUMN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

HOURLY METEOROLOGICAL DATA PARAMETER AND VALUE (X means do not punch)

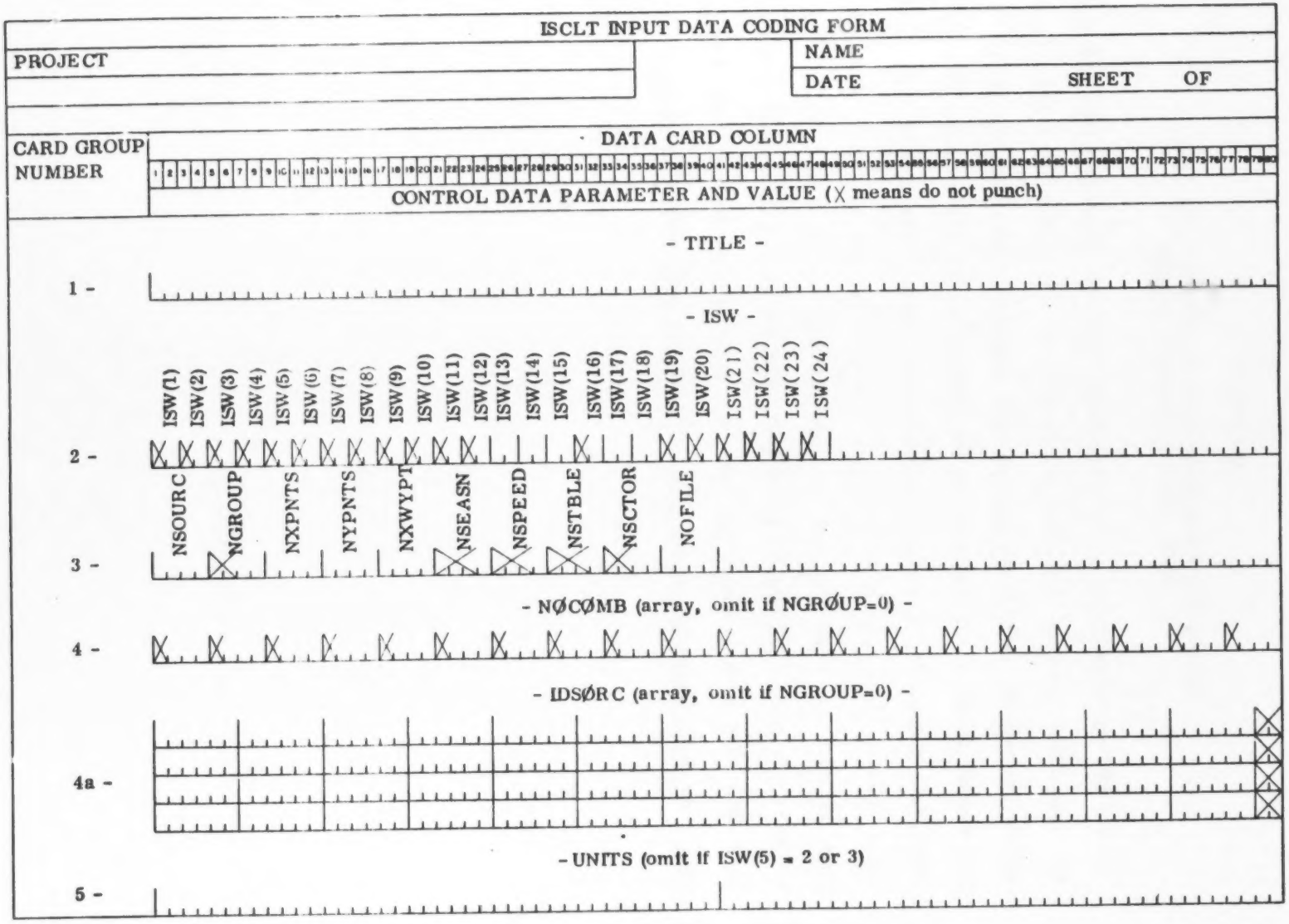
- (omit if ISW(19) = 1) -



APPENDIX H

CODING FORMS FOR CARD INPUT TO THE ISC LONG-TERM MODEL (ISCLT) COMPUTER PROGRAM

The coding forms shown in this appendix are used to prepare the input data for the ISCLT program for card punching. If any input card has all zero values, it may be left blank because the program interprets blanks as zero. The coding forms are presented in the same order as the program expects the input data except for the source input coding forms. The source input coding forms show a form for Card Groups 17, 17a, 17b, 17c and 17d individually. This is done to make the key punching of the source data easier and to minimize the number of coding forms that must be filled out. When the source card data have been punched, the user must reorder the source input cards in sets from Card Groups 17 through 17d, one set for each successive source.


ISCLT INPUT DATA CODING FORM
PROJECT
NAME
DATE
SHEET
OF
CARD GROUP NUMBER
DATA CARD COLUMN
CONTROL DATA PARAMETER AND VALUE (X means do not punch)
- TITLE -
1 -
- ISW -
ISW(1) ISW(2) ISW(3) ISW(4) ISW(5) ISW(6) ISW(7) ISW(8) ISW(9) ISW(10) ISW(11) ISW(12) ISW(13) ISW(14) ISW(15) ISW(16) ISW(17) ISW(18) ISW(19) ISW(20) ISW(21) ISW(22) ISW(23) ISW(24)
2 -
NSOURC NGROUP NXPNTS NYPNTS NXWYPT NSEASN NSPEED NSTBLE NSCTOR NOFILE
3 -
- NØCØMB (array, omit if NGRØUP=0) -
4 -
- IDSØRC (array, omit if NGROUP=0) -
4a -
- UNITS (omit if ISW(5) = 2 or 3)
5 -

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT	NAME
	DATE SHEET OF

CARD GROUP NUMBER	DATA CARD COLUMN
	RECEPTOR DATA PARAMETER AND VALUE (X means do not punch)

- X (axis of grid system, omit if NXPNTS = 0 or ISW(5) = 2 or 3) -

6 -

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT	NAME
	DATE SHEET OF

CARD GROUP NUMBER	DATA CARD COLUMN
	RECEPTOR DATA PARAMETER AND VALUE (X means do not punch)

7 - - Y (axis of grid system, omit if NYPNTS = 0 or ISW(5) = 2 or 3) -

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP NUMBER	DATA CARD COLUMN
	RECEPTOR DATA PARAMETER AND VALUE (X means do not punch)
8 -	- Z (grid system elevations, omit if ISW(1) = 0 or ISW(5) = 2 or 3 or NXPNTS = 0) -

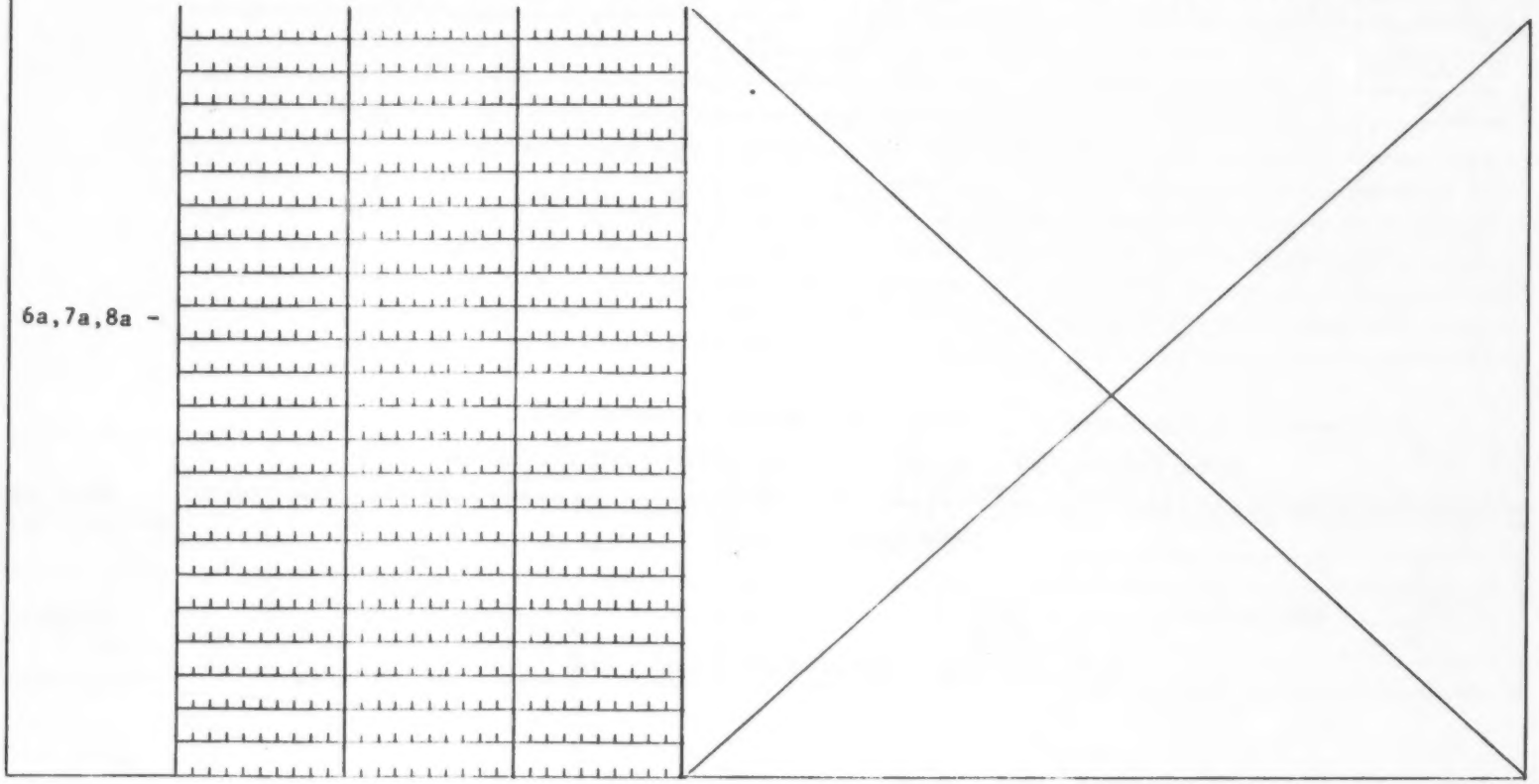
ISCLT INPUT DATA CODING FORM (Continued)

PROJECT	NAME
	DATE SHEET OF

CARD GROUP NUMBER	RECEPTOR DATA PARAMETER AND VALUE (X means do not punch)
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

- X,Y,Z (arbitrarily spaced receptors, omit if NXWYPT = 0, ISW(5) = 2 or 3 and ISW(12) = 0 -

6a,7a,8a -



ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP NUMBER	DATA CARD COLUMN 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 METEORLOGICAL DATA PARAMETER AND VALUE (X means do not punch)
9 -	- FMT (omit if ISW(5) = 2 or 3 or ISW(18) = 0) -
9a -	- FREQ (omit if ISW(5) = 2 or 3 -

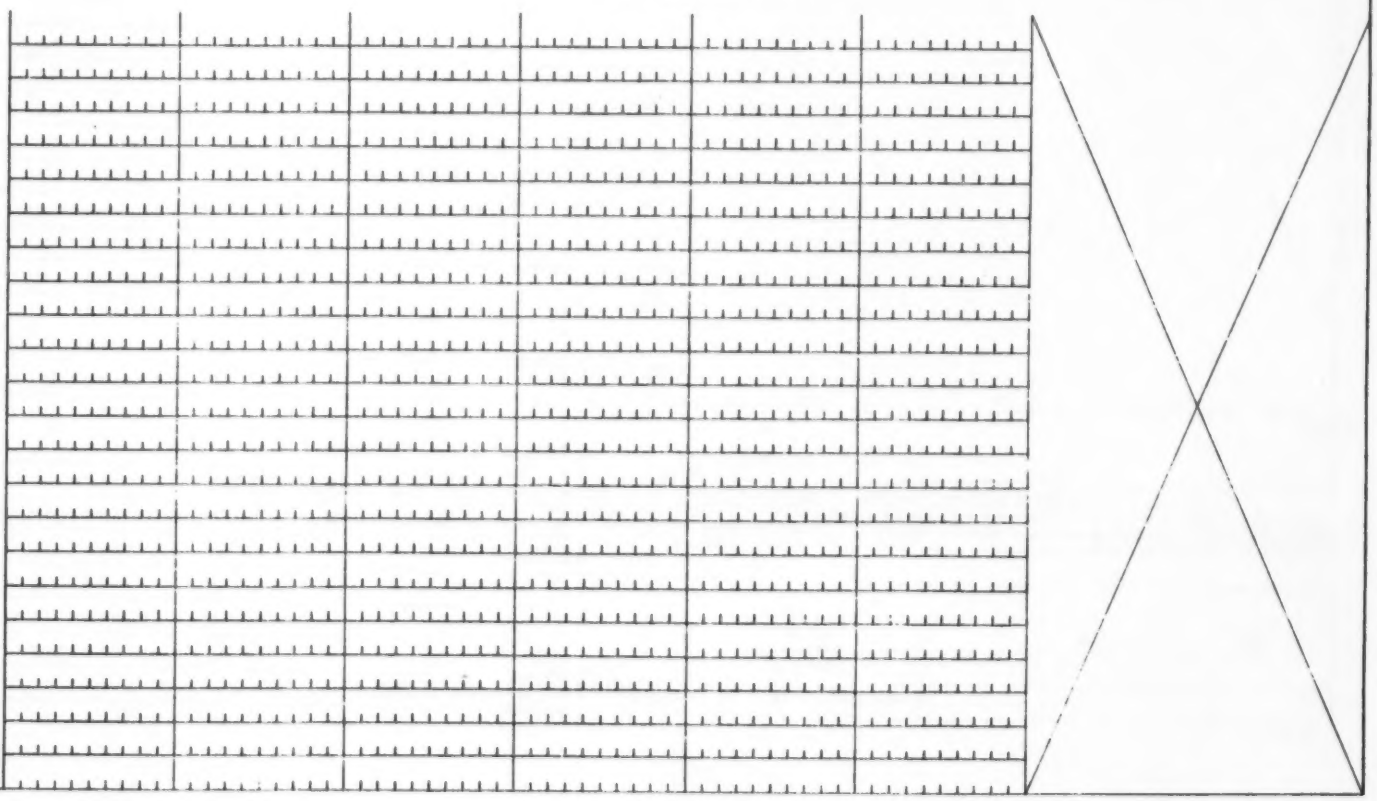
ISCLT INPUT DATA CODING FORM (Continued)

PROJECT	NAME
	DATE SHEET OF

CARD GROUP NUMBER	DATA CARD COLUMN
	METEOROLOGICAL DATA PARAMETER AND VALUE (X means do not punch)

- FREQ (Continued) -

9a - (Cont.)



ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP NUMBER

DATA CARD COLUMN

METEOROLOGICAL DATA PARAMETER AND VALUE (X means do not punch)

- TA (omit if ISW(5) = 2 or 3) -

10 -

- HM (omit if ISW(5) = 2 or 3) -

11 -

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP NUMBER

DATA CARD COLUMN

METEOROLOGICAL DATA PARAMETER AND VALUE (means do not punch)

- HM (Continued) -

11 - (Cont.)

- DPDZ (omit if ISW(5) = 2 or 3) -

12 -

- (omit if ISW(5) = 2 or 3) -

ROTATE TK ZR BETA1 BETA2 G DECAY

13 -

- UBAR (omit if ISW(5) = 2 or 3) -

14 -

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP NUMBER

DATA CARD COLUMN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

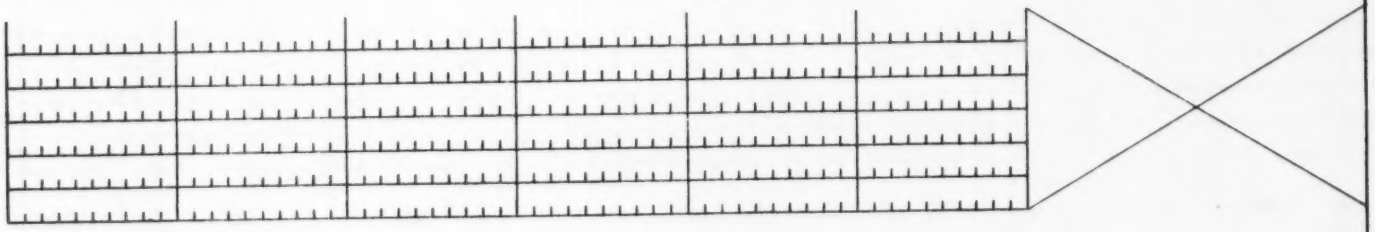
METEOROLOGICAL DATA PARAMETER AND VALUE (X means do not punch)

- PHI (omit if ISW(5) = 2 or 3) -

15 -

- P (omit if ISW(5) = 2 or 3) -

16 -



ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP NUMBER

DATA CARD COLUMN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

SOURCE DATA PARAMETER AND VALUE

17 -	NUMS	DISP TYPE QFLG	DX	DY	H	ZS	TS or SIGYO or XO	VEL or SIGZO	D	HB	BW	WAKE NVS

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT	NAME
	DATE SHEET OF

CARD GROUP NUMBER

DATA CARD COLUMN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

SOURCE PARAMETER AND VALUE

17a -

- VS (omit if NVS = 0) -

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT	NAME
	DATE SHEET OF

CARD GROUP NUMBER | DATA CARD COLUMN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

SOURCE DATA PARAMETER AND VALUE

17b - - FRQ (omit if NVS = 0) -

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP NUMBER	DATA CARD COLUMN
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
	SOURCE DATA PARAMETER AND VALUE
17c -	- GAMMA (omit if NVS = 0) -

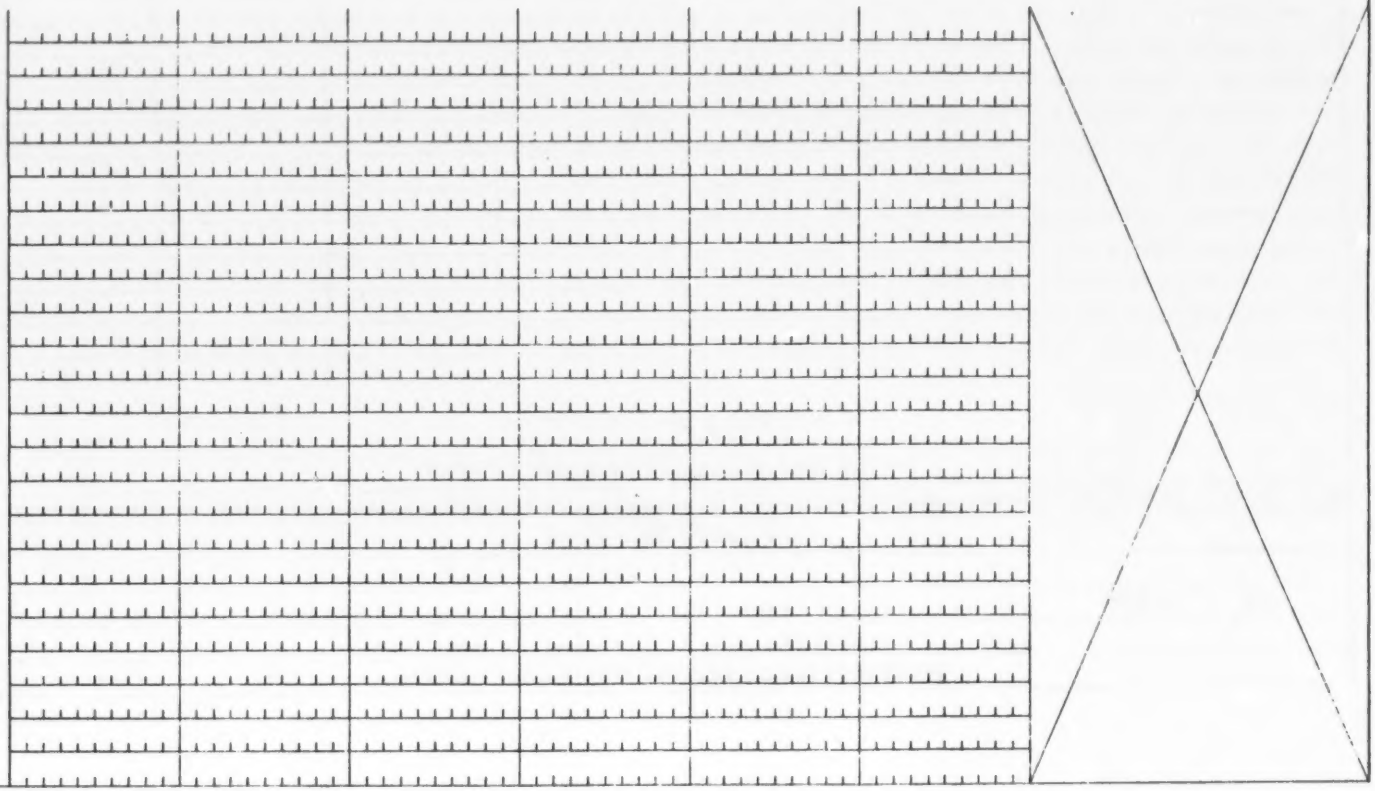
ISCLT INPUT DATA CODING FORM (Continued)

PROJECT	NAME
	DATE SHEET OF

CARD GROUP NUMBER

DATA CARD COLUMN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

SOURCE DATA PARAMETER AND VALUE (X means do not punch)

17d - - Q -